The Builder.

VOL. LIV. No. 2366. SATURDAY, JUNE 9, 1888.

ILLUSTRATIONS.

A Design for a Detached Bell Tower.—Mr. John O. Scott, F.S.A., Architect ..... *Double-Page Ink-Photo.*
Laurel Mount, Keighley.—Mr. W. H. Sugden, Architect ..... *Single-Page Typo-Gravure.*
Design for Monument to be erected in Woking Cemetery.—Mr. Myers Taylor, Architect ..... *Single-Page Typo-Gravure.*
Interior of a Library.—Mr. W. Stirling, Architect ..... *Single-Page Photo-Litho.*
Chisleborough Church, Somersetshire: New Chancel and Vestry.—Mr. Roland W. Paul, Architect ..... *Single-Page Photo-Litho.*
Sculpture: "Cassandra," Statuette, Mr. G. A. Lawson, Sculptor; and Monumental Statue to the late Rev. William Barnes, the "Dorsetshire Poet."—Mr. E. Roscoe Mullins, Sculptor ..... *Single-Page Ink-Photo.*
Sculpture: "Medea."—Mr. Hamo Thornycroft, R.A., Sculptor ..... *Single-Page Ink-Photo.*

Blocks in Text.

The Hall, Barnard's Inn, Holborn ..... *Page* 411
Moulding, Shaping, and Recessing Machine 415
Diagrams illustrating Paper on Iron in "The Student's Column" 418

CONTENTS.

The Testing of Materials of Construction 405
Sculpture at the Royal Academy 407
Notes 407
Architecture at the Royal Academy.—VI. 409
Letter from Paris 410
The Hall, Barnard's Inn, Holborn (Illustrated) 411
The Castle, or Palace, of the Glasgow Archiepiscopate 412
Notes on Some Fen-Land Churches 412
Liquid Fuel 414
The Late Mr. William Hay, Architect 414
Design for a Detached Bell-Tower 414
Laurel Mount, Keighley 414
Memorial about to be erected at Woking 414
A Library Interior 414
Chisleborough Church 414
Sculpture: "Cassandra" and "Barnes Memorial Statue" 414
Sculpture: "Medea" 414
Moulding, Shaping, and Recessing Machine (Illustrated) 415
The Irish Exhibition in London 415
The Institution of Civil Engineers 416
The Acton Main Drainage Works.—Society of Engineers 417
Illegal Remuneration of Town Surveyors: Whiteley *v.* Barley 417
Contracts and Sub-Contracts Horton *v.* Nelson 417
Case under the Metropolitan Building Act 418
The Employers' Liability Bill 418
The Norman House, Christchurch 418
The Student's Column: Iron 418
Recent Patents 418
Recent Sales of Property 419
Meetings 419
Miscellanea 419
The Gordon Statue at Aberdeen 420
Prices Current of Materials 420

The Testing of Materials of Construction.

THE introduction of metals, iron and steel especially, into structures, has revolutionised the methods and manner of construction to a very great extent. Within a comparatively recent period the use of iron,—steel for such purposes was not thought of until much later,—for bridges, roofs, or for any framed structure, would have been looked on as little short of madness. Tools did not exist for the manufacture, handling, and manipulation of large plates, bars, channels, tees, and angle irons; nor could the materials required be turned out in a trustworthy condition except at prohibitory prices.

Up to the time when metals began to be introduced, all buildings were constructed of stone or brick, in some form or other, and timber; and considering that the greatest possible load, under ordinary conditions, on even the weakest of these substances would be at the rate of 14 tons per square foot, this being the weight of a column 300 ft. high, while the crushing strength of the same material is 45 tons per square foot, the margin of safety was obviously very large, and it was not necessary to make any critical examination into its amount. The other material, timber, had probably been used from the foundation of the world: its behaviour was pretty well understood, the margin allowed was at all times great, and it has the advantage that it seldom fails without warning.

When railways were introduced, and wrought iron superseded the cast-iron rail, a great stimulus was given to manufacture, and makers were encouraged to improve their machinery, and to adapt it, not only for rolling rails, boiler-plates, and merchants' bars, but for long bridge and ship plates, channel, H, tee, and angle irons, so that, whereas a few years back the maximum dimensions and weight of plates sold at ordinary market prices was 15 ft. long and 4 ft. wide, and from 4 cwt. to 5 cwt. in weight, a weight of 15 cwt. is now allowed, the limits of length being 30 ft., and of width 5 ft., without extra charge. Rails which were originally rolled in 10 ft. lengths, and weighed some 60 lb. per yard, now sometimes weigh as much as 112 lb. per yard, and are rolled in 30 ft. lengths; forgings are made which could not have been attempted without the use of the steam or hydraulic hammer, and other machine tools; machines and implements have been improved in proportion. In this retrospect the influence which iron and shipbuilding has had in stimulating invention and improvements must not be overlooked.

The rapid progress made by railway enterprise necessitated the construction of a vast number of bridges, and, as cast iron had already been used for this purpose in the case of road bridges, this was the material first adopted to replace stone or brick. It has been repeatedly argued that the use of iron or steel instead of stone or brick in the construction of small bridges is a mistake, as the two former substances are certainly perishable, though we do not yet know what their life is, while the latter are, if of good quality, practically indestructible; and to a considerable extent this view is a correct one, but there are many places where, owing to the limit of height, of weight on the foundations, or of the dimensions of the foundations and abutments, arched structures are inapplicable, and to meet these requirements the straight girder was adopted. In bridges of large span neither stone nor brick can be employed, and the use of iron or steel becomes a necessity.

In the earlier cast-iron bridges the form adopted was the arch, and the experience obtained in the construction of similar bridges built of stone was followed, and the stress was invariably compressive, so far as stresses were understood; the complications caused by variations of temperature had to be learned by further experience. When, however, it was desired to build a bridge having a span of 475 ft. over the Menai Straits, it was decided to use wrought iron, and in the form of a straight box-girder; but so little was the material understood that it was at first proposed to use a circular or elliptical section, and it was not until a number of experiments had been made on specimen girders that the parallelogram was finally adopted. The weight of the girders of this bridge is far in excess of what would be considered suitable in the present day, but it is owing to this great static load that the material is able to bear a working strain of about 7 tons per square inch of section, whereas, the Board of Trade limit for stresses in tension is 5 tons per square inch; and most engineers consider that this allowance, where the strains are intermittent or liable to be reversed, is excessive.

We have endeavoured to show in the foregoing remarks that, up to the time when iron was introduced as a structural material, the necessity for testing, if it existed at all, was of comparatively small importance; but that with the introduction of iron, a material the behaviour of which was little understood, it became most necessary that some tests should be made, not only as a standard of quality, though this is undoubtedly the commercial view of the matter, but also on a scientific basis, so that it might be clearly understood what would be the behaviour of the material under certain conditions, and to what extent it is reliable. We have instanced bridges, because they probably take the first place, and the largest amount of material is used in their construction under the most complex circumstances. No doubt larger quantities of metal are used in the manufacture of rails than in bridges, but the tests in this case are commercial and special. Ships, also, use up more material than bridges, but the conditions are not so complex, or if they are as complex they are met in a different way. The same remarks, however, apply to roof-trusses, to boiler and ship plates, to tyres, to portions of machines, to chains, and, indeed, to almost every form in which wrought iron and steel are employed, and to many where cast iron, copper, and other metals or alloys of metals are used.

We have referred up to this point almost exclusively to iron, steel being only mentioned incidentally; we have taken this course because, when iron was introduced into construction, steel, as at present understood, was not known; it was almost entirely produced by cementation, and was only useful for the manufacture of tools and small appliances; and even after steel had come into general use for rails, tyres, and many such purposes, the restrictions of the Board of Trade, Llo yd regulations, and repeated failures due to its being manufactured and worked under unsuitable conditions, prevented its general introduction for bridge and similar purposes, and in shipbuilding, until long after its general value was fully recognised. The necessity for the testing of steel is, however, even greater than in the case of iron, for while in the latter material its fracture is, to a certain extent, an indication of quality, and the variations in its conditions are, comparatively speaking, slight, and well-known brands may be fairly relied on, steel can be manufactured which shall have little or no greater tensile strength than wrought iron, while it is more ductile; or its strength may be increased to 58 or 60 tons

per square inch of section, the ductility having, at the same time, almost entirely disappeared. Steel also appears to suffer more than iron from punching, shearing, or working, unless it be carefully annealed.

All the earlier experiments on the behaviour of metals, such as those made to decide the form which the girders of the Britannia Bridge should assume, were made either on models or on very small test pieces; and though the former would demonstrate the behaviour of the girder, they would not do the same for the material, and to follow this course of action in every case would entail a cost which would be prohibitive. With regard to the latter form of tests, although those made by Tredgold, Fairbairn, Stephenson, Clarke, and others have governed the rules for the strengths of materials until quite recently, they cannot be considered to be by any means conclusive, and are not applicable to steel. To test the structures themselves after erection, if carried much beyond the load for which they were designed, would be dangerous, as it might seriously affect some portion or other of the truss without the point of weakness becoming visible, and might thus endanger the whole structure, and in most cases the application of the necessary load would be next to impossible. The practice has, therefore, arisen of testing small sample pieces cut from the plates or bars to be used or cast with the castings to be employed; the behaviour of these samples under tests is noted, and from the results obtained deductions are drawn as to the quality and strength of all the parts of the structure.

The work* before us, which forms a very valuable addition to scientific literature, deals with this question of testing very fully, and is not, as might be inferred from its title, a record of tests or a description of apparatus and appliances for testing only, but treats also of the mechanical properties of the materials under consideration, the phenomena of elasticity and plasticity, and the relations between stress and deformation, of the constituent parts of the materials tested, their behaviour under different conditions of stress, temperature, and working; and a collection of results of the testing of the materials ordinarily used for constructive purposes, selected from the most trustworthy sources, is given. The information afforded on this head has, the author states, been obtained from an enormous mass of material, and preference has been given to tests which are complete in themselves,—that is to say, to such as refer to one sample of material tested in all ways rather than to several samples tested under like conditions.

The earliest instances of testing-machines seem to have been constructed for the testing of chains; they were almost necessarily horizontal, and of considerable length. We believe that, with the exception of these machines and others used for gauging the strength of cements and wire, the first introduction of testing for commercial purposes in this country, other than chain testing, was made by Mr. David Kirkaldy, M. Inst. C.E., and that testing for scientific purposes did not then exist; and though at the present time every engineering laboratory is provided with a testing-machine, there are still no establishments in this country where such trials are systematically made under the supervision and at the cost of any public authority, and it is for this reason, no doubt, that we find that not only are by far the larger number of the examples given by Professor Unwin obtained from German sources, but that the testing-machines, of which he describes in more or less detail some thirty-three specimens, are also for the most part of foreign construction and design, those which he finds to be most commendable being in the order given. The Emery machine, constructed in 1879 for the Watertown Arsenal, U.S.A., takes in specimens up to 30 ft. in length, both for tensile and compressive tests, and has a power of 400 tons. A very interesting paper on this machine has lately been read before the Institution of Mechanical Engineers by Mr. Henry R. Towne. The machine to which the second place is given is the Werder machine, which also takes in specimens up to 30 ft. in length; and the 100-ton machines designed by Mr. Hartley Wicksteed, and constructed by Messrs. Buckton & Co., of Leeds, for the laboratories at Cooper's Hill and at the Central Institute of the Guilds of London, take the third place.

Professor Unwin says that the Emery machine is the largest and most accurate in the world, and, from the description which he gives of it, and from the more detailed account given in Mr. Towne's paper, it does indeed seem to be a triumph of mechanical skill. The machine is, as may be supposed from the length of the test pieces, horizontal, and its chief peculiarities are the use of what is called a hydraulic support and of steel knife-blades firmly fixed at the various points of flexure of the levers instead of knife-edges. This machine is stated to have made a test up to 722,000 lb., and immediately afterwards to have been used to ascertain the strength of a horsehair, which broke with a load of 1 lb. Its sensitiveness is so great that though the support weighs some 3 tons, the pressure of a finger on it is clearly recorded on the indicator. The Werder machine is also horizontal, and its chief peculiarity is that the end of the hydraulic ram which produces the stresses is also the fulcrum of the steelyard, and by this arrangement the distances of the knife-edges which form the short end of the lever can be reduced to almost any extent. In the instrument under consideration this distance is 3-16ths of an inch. The Wicksteed machine is a vertical single-lever simple steelyard machine, the force being applied by hydraulic pressure through a quiet compresser, by which all shocks due to the action of the pumps are got rid of, the force of the hydraulic ram being balanced by a jockey-weight weighing 1 ton, and travelling on the lever. The author considers this machine to be inferior to the Werder, but says that it is more handy for ordinary testing, and more easily kept in adjustment than that machine, advantages which are by no means trifling.

Every testing-machine must be itself tested to prove its accuracy in every respect. There are also numberless adjuncts to the machine in the way of shackles and measuring instruments, such as the straight-edge, vernier caliper, the graduated straight-edge, the screw micrometer, and many others, the most sensitive of which appears to be the differential cathetometer by which variations of $\frac{1}{2500000}$ of an inch may be recorded, and the mirror and roller extensometer, which reads to $\frac{1}{100000}$ of an inch.

Another important adjunct to the testing-machine is the autographic recording apparatus, by which the strains and stresses on any test piece are registered automatically; such machines will obviously record minute variations which might escape the attention of the observer, and which would certainly not be plotted on a diagram produced from a number of points. Several machines for doing this work are described in the book to which we have referred, the most practical of which seem to be those designed by the author and by Professor Kennedy.

The influence which the use of the testing-machine has had on the knowledge of the behaviour of metals is very marked; it is clearly shown that the diagram produced from a truly elastic material would form a straight line, but that the line actually drawn is never straight; therefore there is in all cases some small amount of permanent deformation, and that this is greater in cast materials than in those which are wrought. We find that the elastic limits of a material may be raised by loading, but that this condition is unstable, and that if it be increased in tension it is decreased in compression, and *vice-versa;* also, that repeated loadings in either direction, with repeated alterations of the limit of elasticity, will eventually result in producing a condition where the elastic limit is stable, and is practically the same as before loading. The experiments on repetition of stress and for endurance, made by Herr Wöhler, Professor Spangenberg, Mr. B. Baker, and others, go to prove that a material may be strained an infinite number of times in one direction to about double the extent to which it can be strained in opposite directions; or, in other words, it is not the actual amount of the stress which governs the endurance of the material, but its range; for instance, a piece of iron is loaded transversely in one direction with 26·25 tons, and this load is repeated 170,000 times before fracture occurs; but when loaded in opposite directions with 13·4 tons, or a range of 26·8 tons, a similar piece of iron broke with 183,000 repetitions of the load. Similarly, a piece of iron strained with 465,000 repetitions of a load of 13·4 tons acting in opposite directions could support a stress of 19·10 tons at the minimum, increased to 38 20 tons at the maximum, a range of 19·2 tons, an equal number of times before it broke. It is thus clearly shown that stresses acting in opposite directions are twice as destructive as when the stress is in one direction only, and that the elastic limit, and not the ultimate breaking strength, is the measure of the useful strength of the material, and that when the elastic limit is approached, repetitions of these stresses will produce failure; while, if only a portion of the load be removed, the failure, if it be produced at all, will occur much more slowly. This point has been already referred to in the case of the Britannia Bridge, where the static load is high, while the moving load is, comparatively speaking, small.

The introduction of steel has made it possible to build bridges of spans which could not otherwise have been contemplated; for the increased strength of the material, which unlike iron, may be adapted to the work which it has to do, and may be made, for the tension members, with a strength of thirty tons and an extension of 20 per cent. in 8 in., and for the compression members with a strength of thirty-six tons, or even more, and with a comparative reduction of ductility, not only enables the material itself to be more advantageously employed, and to be subjected to greater stresses, but also reduces its weight, and there is, therefore, a saving in two directions. Mr. B. Baker, in his work on "Long Span Bridges," tells us that the limit of span for continuous girders of varying economic depth such as those employed at the Forth Bridge, where the spans are 1,700 ft., is with iron 2,300 ft. and with steel 3,200 ft., though these spans could not be erected to any useful purpose. We may take another form of comparison, namely that of weight: thus, if built of iron, the main girders for a span of 2,200 ft. would weigh 1,375 cwt. per foot of span, while if made of steel the weight for the same length would be 332 cwt.

Professor Unwin remarks that all tests are made either for scientific or commercial purposes, and that the first are necessarily more elaborate and are carried further, and are made under more complex conditions, than the second. We may go further than this, and say that, for commercial purposes, many, if not most, of the scientific tests would be useless, as it has been shown that the elastic limit is the real limit of endurance, and this and the measure of the ductility of the material are all the information generally required.

The author brings out some very curious facts as to the behaviour of metals after they have passed into a plastic condition owing to the pressure brought to bear on them, and on the strength of blocks of stone with pieces of millboard or lead interposed between the testing-machine and the block, showing that the introduction of lead plates causes a very serious loss of strength, and that this loss increases with the thickness of the lead, and may amount to as much as 55 per cent. This diminution in strength is no doubt due to the fact that the lead spreads horizontally under pressure and splits the blocks.

An interesting formula is given by the author for deducing the strength of Portland cement at any given date, from the tests made at three and at seven days, or at any two periods; this formula cannot, however, be relied on in all cases, for many cements, especially such as give high initial tests, continue to increase in strength only for a very short

* The Testing of Materials of Construction. By William Cawthorne Unwin, F.R.S., M.Inst.C.E. London: Longmans, Green, & Co.; and New York, 15, East 16th-street. 1888.

period; the strength then begins to decrease, and what is the extent of this decrease, and what its cause, is not yet known, though the loss of tenacity does not seem to be considerable.

Professor Unwin's remarks will, we think, afford matter for serious reflection as to the necessity for further technical education in this country, especially in the direction of a public laboratory; and the desirability of a uniformity of standard for test pieces, in testing, in gauging, and in specifications, is, we think, emphasised. When we find that the author of this book has been obliged to refer to experiments made abroad for the bulk of his results, and that by far the greater number of the machines and instruments of precision which he illustrates were designed and made in other countries, it behoves us to bestir ourselves; and we commend these remarks to the consideration of those who are interested in the technical education of this country.

SCULPTURE AT THE ROYAL ACADEMY.

IT cannot be said that the sculpture at this year's Academy forms a very brilliant or remarkable collection as a whole, but it includes, at all events, three very fine works, and one which is altogether exceptional in power and originality. This latter is also the central work of the year in regard to scale and position,—Mr. Gilbert's remarkable seated statue of the Queen, a full-size gilt model of the statue erected at Winchester. Of course there cannot be, in a mere portrait statue of this kind, the high intellectual interest attaching to an ideal conception in sculpture; but with that reservation this work occupies the highest rank in the art, and is one which will add a new artistic interest to the old cathedral town for which it has been executed. Her Majesty is shown seated in a great chair of state, the attitude of the head dignified and commanding, holding in one hand a sceptre, in the other a globe, on which stands a most vigorous and expressive little figure of Fame or Victory, we know not which, nor does it greatly matter. The drapery is grand in its masses and folds. The throne is adorned by small figures, which stand out brilliantly against the shadows formed by the little canopied niches behind them; at the back of the chair stands a larger figure representative apparently of Britannia or of Britannia's ocean sway, for she holds a ship in one hand. Above the head of the principal figure is suspended a crown decorated with foliage, and held aloft by the grand curls and scrolls of a wrought-iron bracket growing up from the throne. Every detail of the design is instinct with life and originality. Even the globe held in the hand is not a mere globe; it is encircled by a kind of cage decoratively treated with meridian lines, which stand out free, and upon which the figure aforesaid is perched. The whole forms a piece of decorative sculpture worthy of the great days of Italian Renaissance.

Mr. Gilbert's only rival this year is Mr. Thornycroft, an A.R.A. in the catalogue, but an R.A. since the opening of the exhibition. His "Medea," of which an illustration will be found among the lithographs in our present number, is a very fine conception. It represents Medea charming to sleep the dragon that guarded the golden fleece by the sound of her harp. The "dragon" is hardly formidable enough for the legend, being merely a moderate-sized serpent, with small wings behind its head, but the manner in which it coils round the feet of the sorceress, compressing the drapery of the lower part of the figure, and keeps its head hovering close to the strings of the harp, is most weird and snakelike; the head of Medea is very fine, full of colour and conscious power. Perhaps a still finer work by the same sculptor is the decorative panel entitled "Justice and Mercy," intended for the monument to Gordon to be erected in Trafalgar-square.* One has been so disgusted to see the name and fame of this true hero made the excuse for all kinds of third-class artistic advertisements, that it is a relief to find that there is a chance of seeing one monument to him illustrated by art which in its dignity and simplicity may be somewhat worthy of the subject. Mr. Thornycroft's panel seems inspired by recollections of Donatello; but it is none the worse for that. It is a bas-relief in very low relief, and looking as if rather sunk out of the material than raised upon it; the space is completely filled up by the two draped figures,—Justice, with her usual attributes, and Mercy, carrying one child in her arms (its face partly shadowed, with very charming effect, by the hood over her head), while she lays her hand tenderly under the chin of another little boy, who stands niched in between the two principal figures. As a bas-relief composition, this is admirably treated from a decorative point of view, and tells its story very expressively.

Among the inevitable colossal portrait statues in the octagon, the best by far is the model of the "Sir Bartle Frere," by Mr. Brock, the original of which has been unveiled this week in the Embankment Gardens. The head is a good one for the sculptor, and the attitude is dignified without any affectation of dignity. This cannot be said of "Sir Stamford Raffles," by Mr. Woolner, which is *posé* to a degree, and looks as if trying hard to be sublime, an effort towards which the costume does not render any assistance. The same sculptor has a figure of the late Bishop Fraser, which has the merit of simplicity and of being a faithful likeness; the ordinary episcopal costume, of course, is fatal to sculpturesque effect, but the statue is a good representation of the admirable bishop "in his habit as he lived." Among the examples of ideal sculpture in the octagon the most important is Mr. Simonds's nude bronze figure of "Fortune" kneeling on one knee and spinning a teetotum on a tray. There is a Greek repose and simplicity in the figure, but it is rather devoid of special character and expression. Miss Fawcett's "Rustic Music," a nude youth, seated, and playing on a pipe, is an interesting work which would make one look out for its author's productions in future. The figure bends forward, with a face expressive of interest and concentration in his musical effort. There is a great deal of character in it.

Mr. Lawes's "Half-sized model of a Group," placed in the middle of the Lecture-room, is apparently intended for a kind of colossal "centre-piece." It is a Mazeppa subject, only that the part of Mazeppa is given to a woman, who is bound on the back of the usual rearing horse who figures in all works of this class, and who (as usual) seems about to trample on all the surrounding figures. There is a considerable amount of vigour and spirit in this rather confused mass of sculpture, which only has the misfortune of being totally deficient in meaning or interest. Among the other works placed in the centre portion of the room are a full and portly "Eve," by Mr. Engel ("Birth of Eve" it is called; it should surely be the "Temptation of Eve," as the serpent with the apple is in attendance); a "Cupid and Psyche," by Signor Albano, very pretty marble-cutting, but totally uninteresting; and "The Scout," a work of very different calibre from the two last-named, by Mr. H. C. Christie. This is a powerful nude figure of a man lying on the ground in an attitude of looking for something in front, while his right hand is put back with an action expressing a caution to those in his rear; this is a vigorous and original work. Mr. Samuel Fry's "Hero" is a seated figure, shading her eyes with her hand, as if looking out to sea for her lover; she is seated sideways and turns round to look, an action apparently chosen to show the sculptor's ability in modelling the torso in this position; this is clever, but not altogether pleasing from a sculpturesque point of view. Mr. Junck's "The Polar Spirit" is a rather poetic conception, a nymph reclined on the back of a Polar bear, and with her hair blown forward in the same direction in which she is travelling, not blown back; this incident contributes much to the effect of the work, which embodies an idea, though it is but coarsely modelled. Mr. Britton Rivière's study of an *ecorcé* lion is a brilliant achievement of its kind.

Among the smaller works round the room are, of course, many busts of little or no interest, and works which are "pretty" and nothing more. Among the works which stand out by reason of some kind of originality is certainly Mr. Natorp's curious attempt to model Mr. Browning's portrait in bronze in very low relief and nearly full face. It is a spirited attempt to do a very difficult feat, but it leaves us with the conviction that a profile treatment is better suited to this kind of low-relief medallion; as it is, this looks like a kind of compromise between a painting and a relief, neither one thing nor another. Mr. Mark Rogers's pretty and decorative alto-relief called "Silvia," should be looked at, and Mr. Bruce Joy's medallion-portrait of Miss Elspeth Campbell. The exhibition is noticeable for the number of bust-studies of very old people, real or imaginary, some of them very ugly objects; the best is decidedly the "Study of an Old Man," by Mr. Wenlock Rollins (2,045), for this does not represent merely "the faint defects of age," but the spectacle of vigour and energy of character still displayed under aged features, and that is a fine spectacle and worthy of sculpturesque treatment. Mr. Boehm exhibits a bust of Mr. Gilbert, and also a rather noticeable one (bronze) of Lord Rosebery, a simply-treated bust, with no "trimmings" of any kind, except a small metal shield of arms in front, bright on the dark bronze; this is a highly dignified and slightly idealised bust portrait. Mr. Ford's bust of Gordon, for the Royal Engineers' Mess at Chatham, is a fine presentation of that noble and fearless countenance now so familiar to us. Among the statuettes is a little work by Mr. G. A. Lawson, of which we give an illustration in this number, "Cassandra," a figure which, though small in scale, is grand in the lines of its drapery and the pathetic pose of the head and arms.

We should not omit to mention, among the objects in the lecture-room, the design for a civic collar, chain, and badge in gold by Mr. Gilbert. This is a masterly treatment of the metal with what may be called an efflorescence of ductility, twisting and turning with glorious freedom in all directions; but it does suggest the reflection whether it would not be rather an uncomfortable thing to the wearer, however charming to the spectator.

* See Luke xi., ver. 47, 48.

NOTES.

A SINGULAR state of things was disclosed at the recent interview between the President of the Board of Trade and the representatives of the Railway and Canal Traders' Association. Mr. J. D. Kempson, of Birmingham, gave some particulars of the cases (to which Lord Henniker drew attention some months back), in which he had successfully resisted charges for terminals imposed by the London and North Western and Great Western Railway Companies. It appears that a charge of 8s. 4d. per ton had been made for carriage of undamageable iron for a distance of eight miles, the legal rate, exclusive of terminals, being 3s. The sum demanded was paid under protest, and the companies were sued in the County Court for the 5s. 4d., the result being that they paid the amount into Court before the day fixed for hearing the case. Mr. Kempson stated that he was still sending goods to the same district and paying 3s., while other people are paying 8s. 4d. Sir Michael Hicks-Beach naturally expressed surprise at this, and the explanation given by the traders' representatives was that others are too discouraged by the appeals of the Railway Companies to venture to take action. It is generally believed that the reason why the cases mentioned were not contested is that the Railway Companies are desirous of evading the Court of Appeal on this point, being apprehensive that Hall's case,—which was decided in their favour,—might be upset. Mr. Tomlinson, M.P., stated that if the Bill is passed as it is drawn the companies will

enforce payment of the 8s. 4d. It is certain that the present position of this question is anything but satisfactory, its importance being clearly brought out by the case in point. Mr. Kempson also drew attention to the disadvantage the "light" trades labour under, owing to the unrestricted power enjoyed by the railway companies in respect of charges on "smalls." The system generally in force was fully explained in the *Builder* in August, 1884 (p. 184), when it was shown that some of the companies have Parliamentary sanction for charging what they please for weights not exceeding 500 lb. We then remarked that this matter ought to receive attention in any future measure dealing with railway charges, as the powers intended to be conferred upon railway companies were often exceeded. Mr. Kempson's suggestion is that the limit should be reduced to 200 lb., and it would be very satisfactory if a clause were introduced into the present Bill with a view of effecting this reduction. Up to 1877 they were content to draw the line at 112 lb., but in that year,—considering, presumably, that "the traffic would bear it,"—it was advanced at a leap to the statutory limit of 500 lb.

IN some remarks written on Thursday last week, we predicted that the Institute of Architects might as well preach to the winds as to the House of Commons in favour of anything like a worthy architectural treatment of the new Admiralty Buildings. Before our words could come out in print, the House on that same Thursday evening fully justified them, and the cheap patchwork scheme for what might have been a great building was carried by a considerable majority. Architecture seemed out of the question with most of the speakers; "pounds, shillings, and pence" was everything, grand building nothing. One speaker congratulated the Government that "for once in the matter of public buildings they had done a wise and prudent thing." Is it altogether so wise and prudent to give London the name of being the only capital in Europe where it is not thought worth while to spend anything on architectural beauty in State buildings? We regret that the only architect who is a Member of the House should have supported this miserable architectural *fiasco* of the Government. Mr. Isaacs spoke like a surveyor rather than an architect. He sits on the Government side of the House, no doubt; but we should have ventured to hope that architecture was a subject that might be considered apart from politics. The result is not a creditable thing to the country.

THE colossal bronze statue of Wallace, by Mr. W. Grant Stevenson, A.R.S.A., Edinburgh, has been successfully placed on its pedestal. The pedestal is over 17 ft. high, and the statue 16 ft.; the latter was raised to its place by the help of two masts, about 50 ft. long. The statue, which is the largest in Scotland, weighs about six tons, the granite in the pedestal weighing over 200 tons. The figure is supported mainly on the right foot, the left being advanced and raised on a projecting rock. The right hand grasps a two-handed sword, while the left arm is outstretched, the whole action being intended as expressive of the spirit of Wallace's reply to the friars sent to him by the English king before the battle of Stirling Bridge:—"Go back and tell your master we came not here to treat, but to fight, and set Scotland free." The site of the statue is all that could be wished, the figure rising clear against the sky from nearly every point of view. A viaduct is in course of formation across the Denburn valley and railway, and the statue is placed at the junction of two roads. The execution of the pedestal was entrusted to Messrs. Adam Mitchell & Co., Aberdeen, under Councillor John Morgan, managing partner, and a capital cast, in bronze, of the statue, has been made by Messrs. H. Young & Co., Pimlico. The statue appears to have given great satisfaction locally. It will be unveiled by the Marquis of Lorne on the 21st inst.

PROJECTS are on foot at Athens which will materially alter the appearance of the base of the Acropolis. The whole of the south side is to be enclosed, and the public will only be admitted through a door as now to the Acropolis itself. This provision is probably a necessary one with a view to the preservation of the countless inscribed blocks and fragments of sculpture now lying about within the precincts of Asclepios and Dionysos. Further, it is proposed to run a sort of promenade drive round the whole of the base of the hill, beginning at the Odeum of Herodes Atticus and joining the main round again at the theatre of Dionysos. Workmen have already begun to pull down the bastion which has long inclosed the klepsydra. A good deal of the rock hidden for centuries was thus laid bare, and a few architectural fragments came to light. The making of the road is to be the occasion of a systematic excavation of the north side of the Acropolis, which has never been laid bare. One cannot refrain from expressing the hope that some trace of the temple of the Dioscuri, the site of which is known within such narrow limits, may come to light.

THE occasion of the proposed "Olympic" Exhibition at Athens is also serving the cause of archæology. On clearing the ground at the north side of the peribolus of the Temple of Jupiter Olympius ancient remains have been found. These consist of Byzantine houses, into which have been built a considerable number of architectural fragments belonging to the ancient temple and precinct, among them two bases of statues of Hadrian, such, doubtless, as were seen in such large numbers by Pausanias. One bears a dedication by Statius Quadratus, who, it is known, was Consul in 142 A.D.; the other is dedicated to the citizens of Apollonia, a city of Kyrene. Roman dwellings and baths have also been found. This Olympic Exhibition will have one feature which will be of more general interest. It is proposed to revive at Athens certain ancient Greek plays. In London we are certainly a little tired of Greek plays, but this occasion will be quite another matter. The name of Dr. Dörpfeld is on the committee of management, and it is known that he holds certain revolutionary views as to the relations between orchestra and logeion, which may lead to interesting discussion.

MAJOR ROSS'S valuable collection of letters, prints, and drawings, in illustration of the life, works, and times of Dr. Johnson, was sold at Christie's on Tuesday last, June 5th. Amongst the drawings were S. Hall's sketches, in water-colour or sepia, of scenes and relics associated with Johnson's memory. These were the pew, in the northern gallery of St. Clement Danes Church, which is now distinguished by a brass tablet, set there by some parishioners in 1851, whereof the inscription omits to make mention of its subject's genuine piety and ready charity. His grave, in the southern transept (Poet's Corner), Westminster, between Garrick's and Sheridan's; and that of his wife, who died at the house in Gough-square on March 17, 1752, O.S. Mrs. Johnson was buried in the centre aisle of SS. Peter and Paul parish church, Bromley. The Latin epitaph was inscribed some months before his death by her husband, — "qui multum amatam, diuque defletam, hoc lapide contexit." A sitting-room, one of the attics and staircase-landing of the house in Gough-square, now No. 17, as occupied by Johnson during the period 1748-58. Here were composed the "Rambler" and the "Vanity of Human Wishes"; the "Idler" was begun, and the Dictionary (2 vols. fo. 1755) was compiled. A view, from the south-east, of Johnson's home in Bolt-court, wherein he died in the year 1784. His bust, by Nollekens; his chair and writing-desk, preserved in the library at Pembroke, Oxford. The desk is but a sorry thing, being supported upon three legs that are not even rounded. The ground doorway of the staircase, and the sitting-room of his chambers in Inner Temple-lane. Here, at No. 1, on the western side of the lane, he lived during the interval 1760-5, removing thence into Johnson-court, between Gough-square and Fleet-street. The doorway, marked by its projecting lamp and large hood, was illustrated in our columns on the 12th of September, 1857, two or three weeks before the buildings there were pulled down. On the transom was inscribed, "Dr. Johnson's staircase." Boswell rented chambers for a while in the old Farrar's-buildings, hard by, in order that he might lodge near to Johnson.

THE fire in the Edgware-road has already provided a crop of newspaper correspondence, in which greater precautions against fire in the large London establishments are advocated. It is curious to observe how history repeats itself. It required more than one fire in theatres to awaken the public mind to the need of precautions in these buildings. We fear that some more young women must be burnt in London or in some large provincial town before adequate precaution will be taken in places similar to Messrs. Garrould's. Of course, appliances for use on the breaking out of fire are required, but in addition there can be no doubt that the construction of buildings used partly as places of business and partly as dwellings should be such that those who sleep in them should be able to do so in safety. There should be such connexion with adjacent buildings that the inmates can readily escape, and they should be well acquainted with these connexions, which from time to time should be used by those resident on the premises. But we take it that, as the Legislature has had to interfere in regard to the safety of life in theatres, so it will have to take in hand the subject of the large London shops, which will have to be licensed if used as dwellings, and periodically inspected. A railway company cannot open a new line for traffic till the permanent way has been passed by an Inspector of the Board of Trade, and the same principle is equally applicable to these huge modern shop-dwellings.

IT is proposed to hold an Exhibition of Decorative Handiwork in the Galleries of the Royal Scottish Academy, to be opened in November next and closed in the second week of January, 1889. From the prospectus we learn that the support has been promised of the Royal Scottish Academy, the Royal Society of Arts, the Edinburgh Architectural Association, the Dundee Institute of Architecture, &c. The Exhibition, the object of which is to stimulate skill and promote taste in our artistic industries, is to be divided into two sections. The first is to consist of professional and amateur work executed by the exhibitor, and submitted for competition or exhibition only. The second is to consist of a collection on loan of old and modern works, the examples to be selected by the Executive Committee, and to embrace works in wood and stone carving, modelling in plaster, gold and silver articles, *repoussé* metal work, wrought iron, painted decoration, &c. Prizes will be offered to amateurs for wood carving and turnery, *repoussé* metal work, and embroidery.

THE Stanmore Hall Estate will shortly be put up for sale at auction. The property comprises the hall and the cottage, with about twenty-eight acres; and Aylwards, with two cottage residences, — making another lot of fifty-four acres. The hall, built of stone, in the Gothic style, stands on the top of Stanmore Hill, on the northern confines of Middlesex, which has an altitude of nearly 475 ft. above sea level. This elevation is said to over-top the battlements of Harrow Church tower; and some trees on the common have been a landmark from the North Sea. An ancient watch tower, said to have been a Roman work, formerly stood on this hill; and at Brockley Hill, hard by, a seat of the Cassii, have been found numerous antiquities appertaining to the generally accepted Sulloniacæ of the Roman occupation. The village, along the hill slope, lies on the road to Bentley Priory and Bushey. Laud consecrated the old church n 1632. The foundation-stone of the present

church of St. John the Evangelist was laid by Queen Adelaide, shortly before her death at Bentley Priory on December 12, 1849.

OUR remarks on some of the modern architecture of Glasgow, at the conclusion of our article on the Glasgow Exhibition the other day, seem to be considered dire profanity in some quarters; and a correspondent of one of the Glasgow papers, who is apparently an architect, is very indignant with us for finding any fault with "Greek Thomson's" architecture, and also for implying that Thomson had gained "a local fame." "Q." is mistaken if he thinks Thomson's fame was more than local, or at least more than Scottish, except within the ranks of the architectural profession. The architects in London knew of his work, but not the laity; that is to say, he was never known generally as Scott and Street were known. The same gentleman cannot make out what we mean by saying that some parts of Thomson's designs were "scenic." We should have thought the meaning of the expression (which Fergusson, we believe, first introduced in this sense) obvious enough: architecture which is designed like stage or scenic architecture, for effect, with no reference to interior construction. Some of the features in Thomson's churches and other buildings certainly seem to come under this category. In a general way, however, we have always admired Thomson's design and detail *per se*, very much; our charge was rather that it is unsuited to dull-toned building stone in a smoky atmosphere. It is a kind of design that wants marble and colour and sunlight.

ARCHITECTURE AT THE ROYAL ACADEMY.—VI.

1828, "Design for a Country House"; Mr. F. Bellis. This is a pretty monochrome sketch in brown of a long straggling house, partly in a solid semi-castellated style, partly gabled and half-timbered. It looks well enough, but there is no plan, and if, as we imagine from the vagueness of the title, this is a mere ideal sketch of a picturesque country house independent of any practical considerations of plan, that is a pretty easy thing to do, and hardly architecture in the proper sense of the word.

1830, "Stables, Northleach: Interior of Quadrangle"; Mr. John Belcher. This is a charming bit of stable architecture, and a very good and effective pen drawing. For the most part windows and doors are stuck about as they are wanted; on the right, however, there is a colonnade of heavy thick built-up columns, a kind of Roman Doric reduced to *stable* proportions. In the centre of the courtyard is an originally designed fountain, looking as if it were meant for Doulton ware or something of that kind, discharging water from four masks into a plain octagonal basin. Who can say what educational influence this fountain and the colonnade may not exercise on the mental development of the average groom?

1829, "Board School, Goodrich-road, East Dulwich"; Mr. T. J. Bailey. Like a good many other School Board designs, a building halting between Classic and Gothic, but mainly tending to Gothic; mullioned windows and set-off buttresses, but with the set-offs treated in a manner rather Elizabethan than Gothic. There is a little suggestion of gimcrack in the way in which the string-courses above the upper windows are turned up and twisted into finials. What happens in the high-pitched roof, that it requires window-lets like a Belgian Hôtel de Ville? The general grouping of the building is picturesque and well contrasted, but there is no plan to give a key to it.

1833, "The Percy Shrine, Beverley Minster"; Mr. E. H. Sedding. A very delicate, clear, pencil sketch of a charming bit of Gothic work.

1834, "The Cloisters, Stowell Park"; Mr. John Belcher. So-called in the catalogue, but in the title on the drawing it is a "A Corner of the Green Court, Stowell Park." The latter title seems more correct, as we see no cloisters in the ordinary sense of the word. The drawing is a bird's-eye view of a house and portions of court-yards, divided out in a formal manner with walks crossing at right angles and squares of grass in the interspaces, with stone cannon-balls at the angles; over the roofs of the buildings we see further courts and alleys laid out in the same formal style, and everything tending to persuade the spectator that he is looking at a house of the seventeenth century. On the top of one of the terraced roofs are a whole row of these everlasting little pyramids again, which have no sort of beauty or meaning except as assisting in an archæological illusion. Otherwise, this is a charming and most picturesque pen drawing, and we have no doubt the house is a charming one to live in, in spite of its affectation of archaism. There is a kind of feeling of blessed leisure about these old formal gardens and adjuncts; and as there is, alas! no leisure for any one now, perhaps it is excusable to sham a little.

1835, "An Elizabethan Residence"; Mr. H. D. Wilkinson. This has an elaborate plan attached, and we presume it is a genuine modern house, from the look both of the plan and the design; but if so, why call it "an Elizabethan residence"? This is a pretty pen drawing, but the design does not express the plan very well, and has rather the air of striving to be picturesque.

1837, "All Saints' Church, Falmouth"; Mr. J. D. Sedding. An apparently small church, with narrow aisles, for passage only, and the planning and design very original. At the east end a passage connecting the choir vestry with the clergy vestry forms a kind of low aisle, extending beyond the main east wall, but kept in order by a couple of massive buttresses projecting the whole width of the said aisle, and abutting on the main wall above. These are, of course, carried over the aisle on arches. They enclose between them a group of five "lancets," under a semicircular wall-arch. At the west end of the plan are seen two square projecting bays, one of which forms the baptistery; to what use the other is put does not appear. The effect of the east end, it must be admitted, is a little heavy, but, at any rate, there is no gimcrack about it.

1838, "Design for Colfe's Grammar School, Lewisham Hill"; Messrs. Mitchell & Butler. A very artistic and effective pen drawing, shaded with a warm brown tinting. There is an octagon porch with a very picturesque octagon open bell-turret over. Unfortunately this portion is not quite in perspective, and the inner half of the octagon answers to nothing whatever on the ground plan, and is merely a construction on the roof. This is, apparently, one of those competition drawings in which the aim is to fascinate committees by mere picturesqueness and pictorial effect, and from that point of view no drawing could have deserved better to succeed; but there is a spirit of enlightenment and "assessorism" about now which tends to evade these blandishments of the cunning pencil.

1839, "Brasenose College, Oxford; Interior of New Quadrangle"; Mr. T. G. Jackson. A charmingly-executed sepia drawing of the interior quadrangle of the buildings of which the street-front is shown in No. 1815. The battlemented entrance-tower is seen above the gateway. The architectural treatment is plainer and simpler than in the exterior façade, but otherwise in a similar style. A staircase turret adjoining the inner doorway is picturesquely treated, with large windows in the top story, and a small leaded octagon lantern above. This is a very pleasing design and drawing, from the appearance of repose about the whole; a semi-domestic character distinguishes it, eminently suited for a collegiate quadrangle; and the execution of the drawing is very clear and delicate.

1840, "Stallwork, Amiens Cathedral," and 1841, "Small Staircase, St. Maclou, Rouen"; Mr. Arnold B. Mitchell. Of these sparkling sketches in black and white, the second is the best; the first shows, again, a certain degree of that dangerous facility which Mr. Mitchell's method seems calculated to encourage. It is so temptingly easy to make a glittering effect by working in black between whites, and in this case the ornament up the gablet lines, which we imagine is not pierced through, is shown just in the same way as the thin arcading behind which, obviously, represents shafting seen light against dark. This general lacework effect is very pretty and fascinating, but is it quite true?

1843, "Worksop Priory Church: view showing intended new Choir and central Tower, with Restoration of Transept and Lady-chapel"; Messrs. Carpenter & Ingelow. This is a big thing in restorations; the drawing is a water-colour showing a view of the whole church, with the new work partially distinguished by tint, partially by a small plan in the corner with the proposed additions tinted. The church at present consists only of the nave and the two western piers of the crossing. The additions are really the completion of a building which is at present in a fragmentary state. The proposed additions mainly repeat the plain stern Late Transitional style of the nave; the transept is a restoration of earlier work with round-headed windows; the Lady-chapel, in the south-eastern angle of transept with choir, is more decidedly Early English in style, reminding one of some of the earlier lancet portions of Lincoln. The ponderous tower shows a similar early English character in the upper stage, the lower stage being Early Transitional and round-arched. This is certainly rather like "making history," architecturally speaking; it represents, however, the theory of restoration which commends itself to the majority of churchmen and church benefactors in the present day, and it appears to be thoroughly well done. As far as the transept and Lady-chapel are concerned, it appears that part of the walls are standing, so that this portion of the work is a completion of what partially exists in its old form.

1844, "Capital in North Transept, St. Mark's, Venice," and 1851, "Portion of Mosaic in Baptistery, St. Mark's, Venice"; Mr. Gerald C. Horsley. These are drawings first made in pencil, and then tinted so far as to indicate pretty fully the colours of the material. The mosaic is a spandrel with a figure of a saint, between two arches enriched with inlaid marble ornament. The capital is an exquisite specimen of the Early Italian form of the Classic capital; Classic foliage and general outline, with the spirit of Mediævalism stirring the old foliage into a new life. The necking is clumsy and heavy in comparison with both Classic and Late Gothic forms. A peculiar feature is that the circular bell, broken by Classic volutes at the angles, does not appear to butt direct against the soffit of the abacus, but to bear on certain blocks interposed between into it and the abacus. The abacus is unduly heavy in comparison with Classic proportions, and decorated with inlay in the cavetto. It is a capital very characteristic of its date and position, and admirably shown in the drawing. Both these drawings are models of architectural sketching, being rich and complete in effect, and yet not laboured.

1845, "Design for Portion of West Window of St. John's Church, Upper Norwood"; Mr. Charles Hardgrave. A dark, rich, sumptuous piece of colour; but the figures are very stiff and conventional.

1846, "The New Lower Hall, Stowell"; Mr. John Belcher. We presume "Stowell" is the same with "Stowell Park"; and if so, this gets more and more puzzling. The staircase at Stowell Park is distinctly Jacobean, the new lower hall is distinctly Gothic; late, but still Gothic. There is a projecting stone over-mantel carried on carved corbels, which are pretty in design, but seem rather weak for their office; and we do not quite see the point of raising a Gothic arcade in front of the sloping set-off of the chimney-breast; unless statuettes were to be put in the arches to mask the chimney-breast. That would have a pretty effect. As it is, the arcade looks like a cage erected in front of the chimney-breast for no obvious purpose. Otherwise, the general appearance of this interior nook is very pleasant, and the drawing is an admirable bit of colour.

Shaw House, Newbury.—In the presence of a very numerous company of capitalists, Messrs. E. & H. Lumley offered for sale, at the Auction Mart, on Tuesday last, the historical mansion and estate known as Shaw House, near Newbury, Berkshire. The ancient mansion and grounds were referred to in "Notes" in the *Builder* of last week. In anticipation of the sale an illustrated book of particulars had been prepared, giving a detailed description of the property, the price of this descriptive notice being 10s. The estate altogether contains an area of 1,633 acres, besides manors, village property, and advowsons. The mansion and grounds of upwards of 200 acres were offered in the first instance, but, not being sold, the estate was offered as a whole, when, 38,000*l.* being the highest offer, 45,000*l.* was announced as the reserve, at which the property was withdrawn.

LETTER FROM PARIS.*

THE lamented death of M. Castagnary has left the Direction Générale of the Beaux Arts for the last month without a representative. Many possible successors have been talked of, especially MM. Paul Mantz and Henri Havard (known as art-critics); M. Kaempfen, the Director of the National Museums; M. Roger Ballu, the son of the eminent architect; and others. Probably the appointment may be filled up by the time these lines appear, and it is to be hoped that the choice will be made quite independently of political considerations.

There have been one or two accidents in connexion with the work on the Champ de Mars, which have caused some delay and might have had more serious consequences. At the Palais des Machines one of the immense roof-girders has canted, threatening to pull over some of the others with it. Fortunately no injury to life or limb took place, and the accident has been promptly repaired without even the necessity of replacing any portion of the girder. One of the bays of the Palais des Beaux Arts has also failed, through some hitherto unexplained cause, which will be the subject of a judicial inquiry. The consequence of the failure has been a considerable twisting of the angle piers, and the cornices and work connected with them have been violently displaced. A fresh riveting up of these portions has been immediately necessary, as well as a making good of the injured scaffoldings.

The Palais d'Expositions Diverses, designed by M. Bouvard, is still the most advanced portion of the work, and the framework of the large dome which we have illustrated, and which will occupy a prominent place on the central axis of the Exhibition buildings, is now nearly complete. The Eiffel Tower is now up to one-third of its height, and a very remarkable erection it makes in one sense, whatever may be thought of its beauty or fitness. We may add that a recent examination and report by M. Contamin, the engineer-in-chief for the control of metallic constructions, leaves no doubt whatever as to the stability and the practical success of the construction, which will probably be finished by the end of this year; and the reports which have been circulated in the *Times* and elsewhere as to signs of failure and difficulties in carrying out the construction have no foundation in fact.

The Colonial section on the Esplanade des Invalides is being rapidly pushed on under the direction of M. Sauvestre, the architect, and in various *ateliers* the sculptural decorations for the different pavilions are in progress. One of the most important commissions in this respect is that which has been given to M. Delaplanche. This is a colossal group nearly 25 ft. in height, to stand under the principal dome, and to represent "La France distribuant des Couronnes."

In addition to the *Salon*, there are several artistic exhibitions of interest open in Paris at present. One of the most interesting is that of the drawings and manuscripts of Victor Hugo, in the Georges Petit Gallery. The great poet "saw visions," which are represented by sketches in black and white, in somewhat the manner of Goya; these graphic interpretations of his fantastic dreams and melancholy imaginings are rendered with striking power and force of effect. For Victor Hugo, drawing was only an accessory occupation, and a distraction from literary work, and while he was writing the "Légende des Siècles" or "Les Misérables," he amused himself by drawing silhouettes and landscapes, some of which have been published in various art-journals. Their exhibition in a collected form to-day certainly seems to justify the saying of Théophile Gautier, that Victor Hugo might have been a great painter as easily as a great poet, had he chosen to give his principal efforts to artistic work.

We may mention also the curious exhibition of furniture and decorative objects of the seventeenth and eighteenth centuries, organised for a charitable object, at the Hôtel de Chimay (which has become an annexe of the École des Beaux-Arts), and the interesting exhibition of examples of ancient and modern stained glass collected at the studios of M. Champigneulle.

At its last sitting, the committee for the decoration of the Hôtel de Ville nominated M. Joseph Blanc and M. Schommer for the decoration of the cupolas and pendentives of the grand staircase "des fêtes," of which, as before stated, M. Olivier Merson has the general scheme of decoration in hand. The panels in the side galleries of these two staircases have also been assigned (in both cases subject to the approval of the Council) to sixteen painters, who are to treat them with paintings of landscapes or views in or around Paris. The names of these artists are MM. Bernier, Binet, Émile Breton, Busson, Charnay, Delahaye, Demont, Gosselin, Hanoteau, Lelierre, Emile Michel, Pointelin, Raffaelli, Vayson, Yon, and Zuber. All the portions of the decorations reserved for direct commissions are now disposed of, and the committee is now to submit its selection to the Municipal Council, and to propose, at the same time, a scheme for the subjects and spaces to be put up for competition. There is also the financial side of the matter to be considered, which is rather important, as the value of the work directly commissioned amounts to about 1,315,000 francs, and if we add to that about 460,000 francs for the competition work and 500,000 francs for "marouflage" (the fixing up of the paintings in position), gilding work, and scaffoldings, we get a sum total of about 2,275,000 francs as the minimum cost for adequately carrying out the system of decoration of the Hôtel de Ville, the completion of which will probably occupy about ten years.

The Académie des Beaux-Arts has been proceeding to the election of a member to fill the place of the late M. Questel. The candidates presented by the Section of Architecture were M. Ancelet, M. Pascal, M. Coquart, M. A. Normand, and M. Guadet; to these the Académie added those of M. E. Guillaume and M. Paul Sédille. The voting resulted in the election of M. Coquart by eighteen votes, against seventeen given to M. A. Normand.

At the École des Beaux-Arts a jury presided over by M. Ginain has been occupied in judging the competition designs of students of the second-class for the subjects,—"Un Hôtel pour un Peintre Statuaire"; for which forty-two designs were sent in, and thirty-two "mentions" given. In the competition in "Éléments analytics," of which the subject was "La Façade d'une Maison à loyer," the jury gave twenty-two "mentions" out of thirty-two designs; and in the sketch competition,—subject "Un Corps de Garde,"—eighty-four students competed, of whom, however, only fourteen were selected for "secondes mentions." The result of the sittings is that M. Raimbert (pupil of MM. Daumet and Girault), M. Goerros (pupil of M. Gerhardt), M. Balzac (pupil of M. Raulin), M. Favey (pupil of M. Guadet), and M. Dupart (pupil of M. Pascal), have been admitted into the First Class of Architecture. It is satisfactory to note that the subjects set for these competitions had a practical relation to modern architecture, and were not, as they have too often been, of a purely speculative character.

A committee of painters, sculptors, and architects, presided over by M. Hermant, has also been sitting in judgment on work executed in the Court of Simultaneous Instruction in the three arts. For figures after nature and after the antique the committee has awarded a "troisième médaille" to M. Durand, pupil of M. Gerhardt, and for modelling work by young architects similar medals have been awarded to MM. Lefebvre, Verdez, Varcollier, and Antoine (pupils of M. Ginain), to MM. Arfoidson and Rouvier (pupils of M. Blondel), to M. Anciaux (pupil of M. Guadet), to M. Bataille (pupil of M. Raulin), M. Spinelli (pupil of M. André), and M. Meunier (pupil of MM. Girault and Daumet). In the course of decorative composition M. Demay (pupil of MM. Guénepin and Sédille) has obtained a "seconde médaille." We should not quit the École des Beaux-Arts without mentioning the twelfth session of Sociétés des Beaux-Arts of the Departments, presided over by M. le Vicomte Delaborde, M. Kaempfen, and M. Lucien Magne. In the course of this session M. Jarry, of Orleans, read a paper on some unpublished and very interesting documents relating to the building of the Château de Chambord and the name of its first architect.

An important piece of public work will be soon completed, which was commenced some time since, and which popular opinion had long demanded, viz., the suppression of the numerous level crossings over the "chemin de fer de ceinture," which runs round the line of the fortifications and the outlying arrondissements. These crossings, being the means of road communication between the centre and the outside of Paris, have of course a constant traffic, and give constant risk of terrible accidents, which have indeed happened from time to time. Accordingly, after much trouble and opposition, a sum of eight million francs has at last been devoted to the alteration of these crossings, the expense of which will be divided between the State, the Municipality, and the five railway companies who have running powers over the line in question. This important work has been in active progress for two years, without the traffic having been interrupted for a moment; the cuttings, tunnels, bridges, &c., having been raised or sunk, as required, almost without the public perceiving it, and it is now hoped that all will be complete before the opening of the Exhibition.

The question, what is to be done for the Opéra Comique seems to have just entered on a new phase. M. Lockroy, it appears, has abandoned the intention of opening a competition for the reconstruction of the Salle Favart, and it is said that there is an intention to rehabilitate the house in the buildings of the former Théâtre des Italiens, known under the name of the Salle Ventadour, and at present occupied by a large financial establishment. This project would, no doubt, have the result of providing a new theatre more quickly, but every one seems agreed that the site is badly chosen, and not sufficiently in the centre of the Paris world, and that the Government would have done much better to rebuild the Opéra Comique on its former site, enlarging the site towards the Boulevard des Italiens, and giving the new building a façade of more importance than it could formerly boast.

Among other new constructions is that of the large reservoir at the summit of the Butte Montmartre. This reservoir, which will be fed, by powerful elevators, from the waters of the Vanne, will contain 16,000 cubic mètres of water, and as it is placed 39 mètres above the ground level of the higher quarters of the right bank, it will certainly give the heaviest pressure supply which has hitherto been realised in Paris, and will allow of a decisive increase in the quantity provided for individual consumption in the arrondissements to the north and west of the city.

A very interesting discovery has been made in the course of some excavations in the Rue des Bernardins, where the remains of the church connected with the Convent of the Bernardins have been laid open. The ruins include the remains of some Gothic windows and the lower portions of some of the piers.

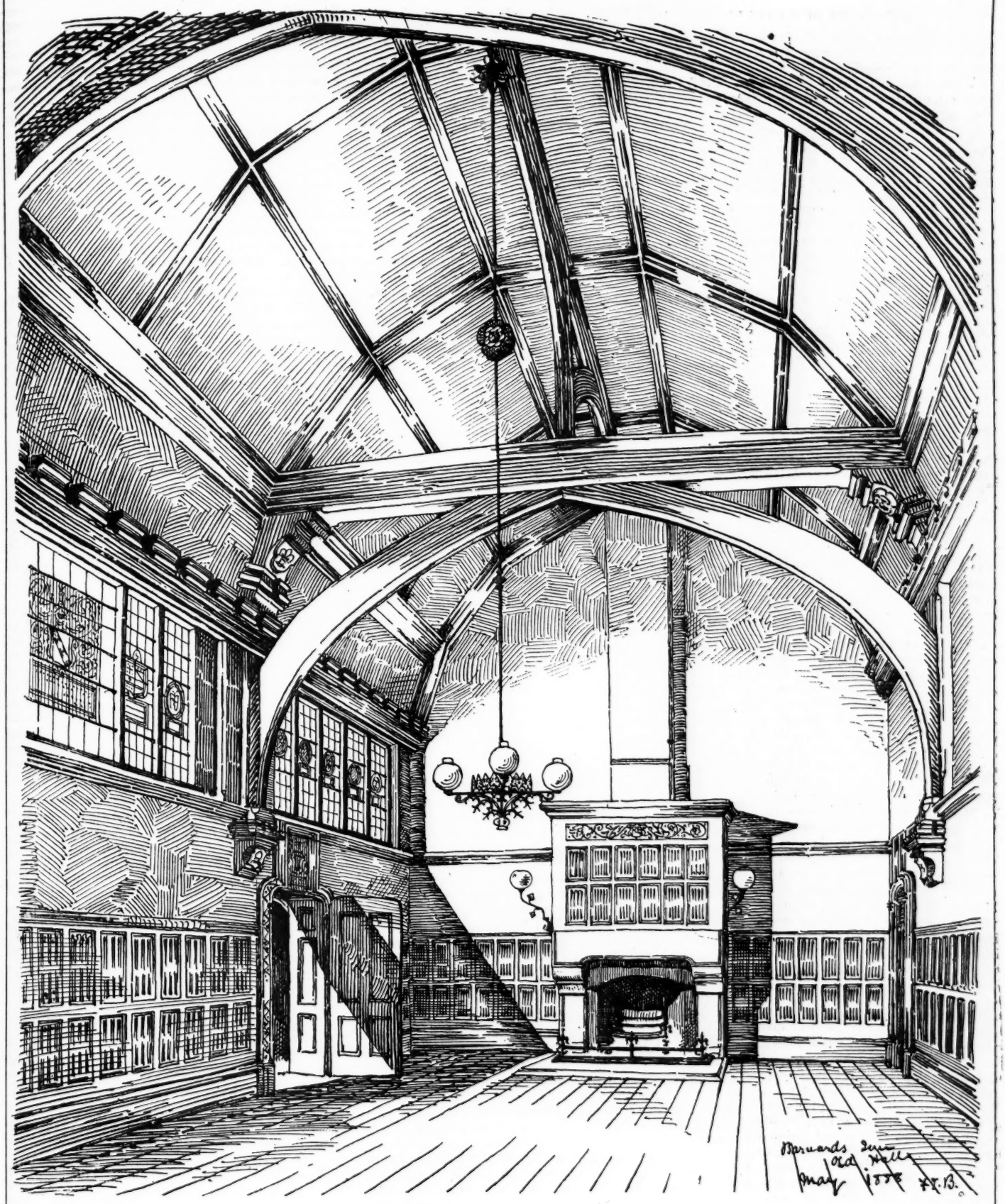
It is announced that the rooms at the Louvre, set apart for the Dieulafoy collection, will shortly be opened, as well as a room devoted to the more recent acquisitions of the Museum; and the Cluny Museum will also shortly open the new rooms recently built and intended for the collections of Mediæval sculpture, and French and Dutch ceramic ware of the seventeenth and eighteenth centuries. The curious collection of ancient swords previously referred to, left by the painter De Beaumont, will not be visible to the public until the acceptance of the gift has been officially authorised.

The tragical end of M. Félix Dupuis, the painter, who (as already reported in the English papers) was killed the other day in a duel arising out of a violently hostile criticism on a picture which he sent to the *Salon*, has produced a painful impression in the artistic world of Paris. M. Dupuis was a man no longer young, and not a very good painter, and would have remained unnoticed but for this dramatic close of his life. His antagonist, one Eugene Habert, who is now in prison, is also a painter of little success, and appears to have revenged himself by the violent character of his critiques on other artists for his own want of success.*

A young sculptor of talent, M. Gustave Saint, has died at an early age. He obtained a medal of the second class in the *Salon* of 1873 for a fine group entitled "L'Amour et Psyche." M. Gustave Allemand, an artist who has also died at the early age of forty-two, was a landscape painter of distinction, a pupil of M. Harpignies; his last work, "Les Bords de l'Ambi," figures in the present *Salon* exhibition.

* Unavoidably postponed from last number.

* Perhaps on the English side of the Channel the most natural reflection would be, how extremely illogical and unsatisfactory is the system of duelling as a means of avenging an affront. Here is an unfortunate artist much chagrined by a criticism on his work, and by way of mending matters he invites the critic to come out and kill him.



The Hall, Barnard's Inn, Holborn.

The death of M. Castagnary, to which we referred at the commencement of this letter, was entirely sudden and unexpected. He was a man of most amiable personal character; artistically, his strong tendency in favour of the "new school" of painting had been evinced for twenty years back in articles and critiques which, at the time they appeared, scandalised dreadfully the numerous partisans of academic art. After having for a long time treated artistic questions with great ability in the columns of *Le Siècle*, he had taken a turn in the direction of politics, and became a member of the Municipal Council, where his influence was effectually exercised in favour of the system of public competitions for artistic work, now so much in fashion in Paris. When in 1879 M. Grévy became President of the Republic, M. Castagnary obtained a seat on the Conseil d'État, and finally replaced M. Kaempfen as the head of the Direction des Beaux Arts, where his intelligence and individuality of character had already happily triumphed over bureaucratic routine,—a statement which is perhaps the best funeral honour that can be paid to an administrator.

The Printing Machine Managers' Superannuation Fund. — The annual excursion in aid of the funds of this charity will take place on Saturday, July 7, to Yarmouth. The Fund was established fifteen years ago to provide a small allowance to printing machine managers who, from age or blindness, become incapacitated from following their trade. Further information may be obtained of Mr. D. D. Leahy, Secretary, 134, Salisbury-square, Fleet-street, E.C.

THE HALL, BARNARD'S INN, HOLBORN.

As we mentioned some little time since, Barnard's Inn is to be sold, and probably the buildings will be pulled down. We give here a sketch of the interior of the hall, as a memorial of its appearance and design. The room is a small one, regarded as a hall of this kind, not being more than 35 ft. to 40 ft. in length. It has been entirely unused and standing empty for some time back, as was the case with other portions of the buildings. Some portions of the Barnard's Inn property, that part facing Fetter-lane, especially, are much dilapidated; but the hall is in excellent preservation, and it seems a great pity to pull down a good room like this, if it can be turned to any useful purpose. It is not, however, of course, of sufficient value as an architectural

monument to be worth preserving merely for its own sake, if the site is actually wanted for a different class of building.

THE CASTLE, OR PALACE, OF THE GLASGOW ARCHIEPISCOPATE.

IN connexion with the recent opening of the loan museum in the model or restoration of the ancient episcopal palace of Glasgow, on the grounds of the Glasgow Exhibition, some notes as to the history of the actual building may be of interest.

Very little of fully certified history has been handed down concerning this structure, the last above-ground vestige of which was finally removed at the close of last century, but enough has survived to show that in Mediæval times it occupied a position of no small importance. The pile itself, with its courts, shrubbery ground, and the embattled wall which enclosed the whole, had position immediately to the west of the cathedral and cathedral yard, the dividing line consisting of a narrow passage only; and close around here, in early times, for purposes of shelter and protection, as was the wont with infant communities then, clung the nucleus of the now great city of Glasgow, at first a mere sprinkling of huts of the hamlet order, but afterwards growing and assuming such lasting names as Castle-street, Kirk-street, and Drygate. The ruthless hand of "improvement" has rubbed out nearly the whole of the old-world surroundings here, and the only genuine relic of ancient times is the cathedral itself, for the singular preservation of which, at a ruefully-critical juncture, the Scotch have sense enough to be ever profoundly grateful. The site of the old castle and grounds is now open space, bounded on the north by the front of the Royal Infirmary, on the west by Castle-street with houses on its west side only, on the east by the western railing of the cathedral yard, on the south-east by the Barony Church, a masterpiece of the hideous architectural debasement of the last century and now happily condemned; and on the south by Kirk-street and Drygate-lane leading down to the busier parts of the modern city. Grass plots, with young saplings of tender growth, have by the skill of the landscape gardener been made to diversify this expanse; but the general effect is a little dreary, and some sentiment of pity is excited for the old cathedral thus fallen upon changed times, and sentenced to a most incongruous vicinage. The see of Glasgow was founded by Kentigern, otherwise known as St. Mungo, about 560, some centuries before the village or town of Glasgow could be said to have had any beginnings of existence; but its history is virtually a blank up to early in the twelfth century, when John Achaius was presented to the charge. Of the earlier conditions of the bishop's fortified palace or stronghold nothing has been handed down by tradition; but from the remains of earthwork clearly traceable at a comparatively recent date, it is known that the castle in remote times was defended outwardly by an encircling fosse or moat, with a drawbridge and portcullis at the north-west corner. It is highly probable that a wall of some sort followed the inner escarpment of the ditch, and materially strengthened the defences, but no remains are upon record. There is mention of the "bishop's garden," under date 1268, and an incidental reference to the castle itself (the first) of date 1290. It is known to have been garrisoned by the invading troops of Edward I. at the opening of the fourteenth century; but the first reasonably tangible notice of the building preserved to us bears no earlier date than 1430, and attaches to the episcopate of Bishop Cameron, who seems in that year to have applied the finishing touch to extensive additions for some time previously going on. It has been claimed for this enterprising prelate that he erected the whole of the castellated group of masonry (exclusive of the wall), subsequently known as the Bishop's palace or castle, but the title is a doubtful one. At least, he it was who built the great tower, which was the dominating feature of the structure. Archbishop Beaton at the beginning of the sixteenth century made some enlargements, and at the same time drew around the castle yard and inner grounds, at some distance outside the ancient circular line of the ditch, a crenelated wall, 15 ft. high, with tower and bastions, to which there was added by Archbishop Dunbar, between 1524 and 1547, a massive gatehouse, embattled aloft and flanked by circular towers. Beaton's new wall took a somewhat irregular course, closely conforming itself to the angles and faces of adjacent streets and buildings, and enclosing orchard and garden ground which before had lain outside the bounds of the defending ditch.

The castle itself was of hewn stone, and a very fair view of it, in its completed condition, is preserved in Slezer's "Theatrum Scotiæ," published in London, 1693, this view not only taking in the archiepiscopal fortress itself, but showing in position the bell-tower and consistorial house which originally formed adjuncts to the west front of the cathedral, but were afterwards removed under, perhaps, a misguided call for improvement. In general guise and features as here presented, the building passed through its more stirring days, and played its part in the rude politics and stormy polemics which rent Scotland during the sixteenth and seventeenth centuries. The castle of the Bishop of Glasgow was the only position of embattled strength in that neighbourhood, and in the eye of faction it constantly bulked as a place which it was signally advantageous to possess. The cathedral was well protected by the religious halo appertaining to a consecrated edifice; but with the mere dwelling-place of the bishop freedoms were unceremoniously taken when occasion instigated. In 1517 the castle received considerable injury at the hands of John Mure of Caldwell, and party. Afterwards the Earl of Lennox invested the place, but the siege was quickly raised on the approach of a force under the Regent Albany. Between 1543 and 1545 it fell into the possession of John, Earl of Lennox, who partly strengthened it; but after ten days of battering by the cannon of the period the garrison surrendered on an assurance of safe conduct,—only, however, to be treacherously put to the sword. In 1560 Archbishop Beaton summoned that remnant of the landed power of Clydesdale still adhering to the ancient faith, to aid in dislodging the Duke de Chatelherault, and this object was accomplished successfully; but on Beaton flying the country at the full climax of the Reformation it was again seized by the duke, who in his turn had to give it up to the Earl of Lennox. The party of the Hamiltons, unable themselves to garrison the castle, sought in 1571 to demolish it utterly, in order that it might not, at least as a place of strength, fall into the hands of the other faction. An armed approach frightened away the intending destroyers, and the building was spared; but the time of natural decadence had already set in. Some repairs were executed under Archbishop Spotswood in 1611, but so low had its fortunes fallen by the middle of the century, that it was then used as a place of detention for prisoners awaiting trial in Edinburgh. Still, in the year 1661, it was described as a "goodly building near the church"; but a quarter of a century later, during the excitement which accompanied the abolition of Episcopacy, it was roughly handled, and became an admitted ruin, although even then bearing traces of former magnificence. After the Rebellion of 1715, however, the ruin made shift to accommodate three hundred captured Highlanders for a brief space, and here its active service closed. By the middle of the eighteenth century it had become of importance only as a handy quarry for the building operations of a growing city. In 1791 the last aboveground vestiges received doom when the Crown granted the whole area, with remains, towards the building of the Royal Infirmary, which finally took position some yards to the north of the castle site. So late as 1853, however, traces of the ancient moat and drawbridge were come upon during some levelling work; and there are still to be seen within the cathedral yard, doing duty there as flat or prostrate tombstones, a few of the stone steps formerly having place in the circular staircase of the great tower. A small number of sculptured stones are still traceable elsewhere over the city; but, for the rest, the dispersion has been as complete and untraceable as in the case of the freestone seams of a worked-out quarry.

International Ironmongers' Iron and Metal Trades' Exhibition. — We have received the prospectus of this Exhibition, which it is proposed to hold in the Royal Agricultural Hall, Islington, from November 12th to 24th, 1888.

NOTES ON SOME FEN-LAND CHURCHES.

SKIRBECK CHURCH is only the nave of a once large and stately fabric. The chancel has entirely perished, and so have the two easternmost bays of the side aisles on either side. What is left is a good example of Early English of the Lincolnshire type, with a square western tower of Perpendicular date, and rather poor outline. The nave has a clearstory lighted with rather large plain circles, without any cusping. The existing fabric was well restored by Sir Gilbert Scott some years back, from an almost incredible state of neglect and decay. But no attempt was made to re-erect the missing parts. Indeed, the church as it is, standing on the very edge of the parish, is more than sufficient for the churchgoers of the township, while the walling up of the two easternmost bays of the arcade, where the aisles are wanting, provides so good a ritual chancel that the absence of a constructional chancel is hardly felt. The east window, inserted in the blocked chancel arch, is a miserable example of debased churchwarden's Gothic. The arcade is one of much interest. The piers exhibit four slender detached shafts, with capitals of stiff foliage, set round a central core with four broad hollowed sides, in which the shafts stand, and as many narrow straight sides, the whole combined into one by a circular abacus crowning the group. On the south side, towards the west end, the piers have shown symptoms of giving way, and in the fifteenth century they have been strengthened by a device which I never remember to have seen elsewhere. Slender buttresses have been added to the shafts on their outer side, spreading out as they descend, so as to give a much wider base of support to the crippled piers. This unusual plan has proved effectual, and there seems to have been no further disturbance. It deserves mention that the piers at the western extremity of the south aisle appear to be earlier than the rest of the arcade, contrary to the general rule that the eastern part of a fabric is the earliest. The church within looks bare and uncared for. It is supplied with rush-bottomed chairs, not too orderly in their arrangement,—a poor substitute for the solid open benches which are the only proper furniture of an English parish church. A wide open area, with a handful of chairs planted down here and there in groups, has a very chilling unhomelike look; certainly not attractive to worshippers.

Fishtoft Church stands very pleasantly on a rising ground above the dead level of the surrounding fen, well shaded with fine trees, through whose leafy screen the sturdy grey-stone tower is seen to advantage. It is a fabric of much interest and considerable quiet beauty, consisting of a clearstoried nave with aisles, a well-developed chancel, western tower, unengaged, and south porch. The chancel walls are Norman or Transitional, with pilaster buttresses, and preserve one Norman light on the north side, and the remains of a priests' door of the same style on the south. This door has been treated in the most unceremonious way by later builders. A broad lancet, very widely-splayed on the inside, has replaced the original Norman light, and has been brought down so low as to cut off the semicircular head of the door below, leaving the side shafts supporting a horizontal lintel. The chancel has been altered in Decorated and Perpendicular times. The east window is a very fine specimen of the former style, with three circles in the head, each containing smaller cusped circles. Two of the side windows are of decided Perpendicular style, the other two still retain a trace of Decorated feeling. The nave is an instructive example of the entire re-casting of an early fabric by Perpendicular builders. The exterior would lead you to conclude that the whole building, together with the tower, had been erected at one time, *d'un seul jet*. On entering you discover your mistake. The southern arcade is entirely Decorated; plainly chamfered arches rising from piers, consisting of four filleted cylinders, with capitals and bases unaltered. On the north side the piers remain the same as their opposite neighbours, but they have been supplied with fresh capitals and bases at the time of the recasting of the western part of the fabric. To this latter period belong the whole of the aisle walls and the clearstory, with the large, well-designed super-mullioned Perpendicular windows which light the church, all of the same pattern, and

the flattish, tie-beam, open roof. The tower-arch and font bear impress of the same mind, and are evidently coeval with the clearstory and aisles. The whole is built of excellent ashlar of a dark grey hue. The buttresses of the aisles and the base moulds, by their fine character, add much to the dignity of this striking exterior. The tower, though plain, possesses much dignity. It is broad for its height, and exhibits the bulky character common to several of the churches of the district; and, like them, is destitute of pinnacles, though the stumps at the corners seem to indicate that they were intended. Above a plainish four-light west window is a small niche, which we shall see again at Freiston, enshrining a statue of the patron saint, St. Guthlac, the hermit of Crowland, to which abbey Fishtoft belonged. The western door is plain, and hardly dignified enough for its position. One of the most striking features of the exterior is the well-designed rood-turret at the north-east corner of the nave, finished with a tall pyramidal spirelet.

Within, the effect is hardly as good as without. The interior is rather wide for its height, and suffers much from the scarification of the walls, laying bare the random masonry, never intended to be seen. It can hardly be deemed a compensation for this senseless proceeding that an abundance of Norman fragments built up in the walls prove the existence of a former church of that style, probably built at the same time as Freiston, in the early part of the twelfth century. The church is well seated with open benches. In the chancel arch is a tall open-work screen, of very good work. The lower story of the tower is also separated from the church by a still finer screen removed from Freiston Church, to which every rule of justice and fitness demands that it should be restored. Being too long for the narrow tower arch the stolen goods tell their own tale by being arranged at an angle to one another, like three sides of a hexagon. The font is a fine specimen of a common type. A richly-panelled octagonal basin is supported on an equally richly-panelled stem, the whole standing on an octagonal flight of three steps, provided with a stone kneeling-place for the officiating priest at the west end. There seem to be hardly any ancient sepulchral memorials. A small slab bearing a well-designed cross botonnée, lying north and south, near the font, was the only one I noticed.

The Church of Butterwick is smaller than either Skirbeck or Fishtoft; but it maintains a family likeness to the churches of this district, especially to the latter. We have the same low, bulky square western tower, though here it is a modern edifice of brick, plain to baldness, the broad nave, and the rood turret at the north-east angle, ending in a spirelet, which were noticed at Fishtoft. Here, too, a Decorated nave has passed under Perpendicular hands, though with less loss of its original character. The arcade and aisle walls and windows are of the fourteenth century, with a superimposed clearstory and roofs of the fifteenth. The earlier building is of stone, the clearstory, like the later tower, of red brick. On the apex of the eastern gable is perched a sancte bell-cot, also of brick, of very pleasing outline. The bell still exists, degraded to a base use at Boston, and should be restored to its place. The chancel is a complete rebuilding on the old Perpendicular lines. The work of restoration was done by Mr. Fowler, of Louth, with very little damage to the ancient character. The nave arcade is of four plainly-chamfered arches on low octagonal piers, which are shorter on the north side than on the south. The side windows in the aisles are square-headed, of two lights, of Decorated date. The windows at the ends are of three lights, with plain intersecting mullions, the spaces of intersection uncusped, a not uncommon, but, to my eyes, very unpleasing form. The chancel arch is of unusual width and ungraceful in its sprawling outline. Beneath it stands a very beautiful, tall screen, of delicate open-work. The old colouring has been effectively restored by Mr. Fowler. The church is nicely seated with open benches. The altar and chancel arrangements are simple, but dignified, and the whole building bears the marks of loving and reverent care. The font is a plain modern basin, set upon a low cluster of eight Early English shafts.

The church at Freiston is like Skirbeck, only the nave of a much larger edifice, with this difference, that the latter was never anything more than a parish church, while the former was conventual, Freiston being a cell of Crowland. To be strictly correct, it should be said that Freiston was a double church, like Arundel, Blyth, Dunster, Elstow, and a score more, of which the nave was parochial and the choir and transepts conventual. The common fate befel the church at the Dissolution. The monastic portion,—the true priory church, choir, transept, and central tower,—was pulled down by the grantee, the nave being left standing for the use of the parishioners, the eastern arch of the crossing being walled up and an east window inserted in the wall. The eastern responds of the north and south lantern arches are seen on the outside of what is now the east wall of the church. At the beginning of the century the springing of the arches remained, but has now quite disappeared. The western tower, a fine example of the same broad massive type as Fishtoft, and evidently the work of the same designer, must have been erected fifty years at least before the Dissolution. As at Wimborne, and Blyth, and Malmesbury, this tower was doubtless built by the parishioners to receive the parish peal of bells, and so put an end to the squabbles which were perpetually arising between them and the monks as to the hours of ringing. The side aisles are both modern; the north aisle comparatively, the south aisle absolutely so. This last was erected only a few years ago to take the place of a wretched lean-to of the local "stud and mud" which had been put up in the bad times when anything was deemed good enough for the house of God, on the site of the old narrow Norman aisle that had fallen into ruin and had been pulled down to save the cost of repair. At the east end are some very interesting fragments of the richly-moulded Norman arch which opened into the transept. This new aisle is low and plain, without pretence, but quite in harmony with the original structure. The north aisle, which is much wider than the south, is of brick, evidently added by the parishioners when increased accommodation was needed for worshippers. There is nothing in the style to forbid its having been built after the Dissolution, though, perhaps, on older lines. The windows are chiefly Late Perpendicular of three lights, but two are later still, and in the awkward attempt at tracery bear a Jacobean stamp. This aisle is strengthened with very bold buttresses of excellent outline. There is a north porch of stone patched with brick. The outer doorway arch rests on short sturdy cylinders of Early Decorated date. The inner doorway is a very low flat-headed ogee, almost horizontal, inserted in a tall blocked pointed arch. On the south side a round-headed door in the easternmost bay of the aisle marks the entrance from the eastern walk of the cloisters. There was another door corresponding to the western walk, the traces of which were destroyed when the new aisle was built. A low brick wall resting on a stone foundation running parallel with the aisle, and connecting these two doors, probably gives the breadth of the north walk of the cloisters. The ground all about is "humpy" with foundations. The discreet use of the pickaxe and spade under Mr. St. John Hope's guidance, or that of some other intelligent excavator, would, no doubt, reveal much of the plan of the priory buildings.

Of the existing church, nine bays in length, the greater part must have been erected shortly after the foundation of the priory early in the twelfth century. Six eastern bays of the arcade, together with the blocked tower arch already referred to, are of Transitional Norman, *circa* 1140. The three western bays are an addition of the thirteenth century. The Transitional Norman arcade exhibits low semicircular arches, supported on sturdy cylindrical piers, with fluted capitals. The mouldings of the arches are very simple, with a bold torus on the inner soffit. The only arch which shows any decoration is the easternmost arch of the range on the south side. The pointed arches of the three western bays are equally plain in their mouldings, and also rise from simple bulky cylinders. The responds at either end of this addition show a little more ornament. They consist of a cluster of three half-shafts with capitals of stiff trefoiled leaves. Above the arcade, without any intervening triforium or triforium space, is a lofty Perpendicular clearstory, continuous without a break from end to end of the nave. The height of this clearstory is remarkable, rather exceeding that of the arcade it surmounts. Each bay contains a three-light Perpendicular window. The effect of the unbroken range of lofty windows is certainly very striking, but it must be confessed that the openings themselves are not well proportioned, and that the heavy super-mullioned tracery is deficient in refinement. Above it, on the outside, it is interesting to notice the old nebulée corbel-table of the Transitional clearstory, taken down and rebuilt at a greater elevation. The old builders never wasted material to hand, though they would too often, with the calm contempt of a new age for the work of their forefathers, use up richly-carved mouldings and window-heads as so much walling stone. One of the most interesting features in the interior is the rood-turret, intruded between the third and fourth arches from the east on the north side, and robbing each of a portion of its legitimate aperture. The newel stair remains perfect within, with an arched door at its foot, and a plainer door high up in the wall originally opening on the loft. The position of a rood-turret one-third way down the nave, like that at Dunster, is a proof if no other existed, of Freiston having been a double church, with the three eastern bays of the nave serving as the parish chancel. The tower, as has been said, is a fine square solid fabric, well buttressed, but without pinnacles, which were either never executed, or formed no part of the original plan. The west door, as at Fishtoft, is rather too small for the size of the tower, and would be better if the simple arch had been set in a framework of panelling, so as to extend its breadth and give it consequence. The west window of five lights is a very fine example of well-designed Perpendicular fenestration, of the type where the principal arch embraces two sub-arches, each forming a three-light window, the central light being common to the two. Above the window, completing the resemblance to Fishtoft, is a small niche tenanted by a statue of the patron saint, upon his staff and wallet, designated as St. James-the-Greater. The popular belief has been that the dedication of the church was to St. James-the-Less, and the festival has, of late years, been held on May 1st, an error which this statue has sufficiently refuted. The east window, which is inserted in the old arch, put in when the east end of the nave was walled up, is a modern copy of the western window, but much inferior to it in vigour. The history of this window is somewhat singular. Though the arrangement only dates from the middle of the sixteenth century, it is the fourth that has occupied the place. First came the window put in when the lantern and choir were destroyed. That gave way to a Debased window similar to that at Fishtoft. Then that was walled up, and ultimately the present tracery was inserted in the old window arch. Traces of all these successive stages came to light during the process. The roof is of low pitch, with tie-beams and carved wall-posts. It is of good character, and has been well restored. The tower-arch is of considerable lightness and admirable proportions. The general effect of the interior, as seen through this arch from the west door, is one of unusual stateliness. The fine open-work chancel screen some years since, as already said, was sold or given to Fishtoft, and only the parcloses across the aisles remain. That across the south aisle is of singularly beautiful design. The absence of the central portion of the screen is much felt. The sooner it is returned to its proper place the better for the church, and the more creditable to all parties concerned. The font is brother to that at Fishtoft. Like that it stands high, on an octagonal flight of steps, with the same kneeling-stage to the west, and consists of a panelled octagonal basin on a similarly panelled shaft. The Freiston font, however, has a glory all its own in a very lofty pyramidal cover of carved wood, bearing traces of the rich colouring, blue, gold, and vermilion, which once adorned it. This beautiful work of art has either been singularly well preserved, or if restored, restored with singular skill. Freiston church, a few years since, was relieved of the western gallery, which had the tower arch and the pews which disfigure the aisle, and was simply but appropriately fitted with open seats and other appropriate furniture. The condition of the church is such as to deserve high commendation. Architecturally it is a building of much interest, and deserves to be better known, as a capital example of the type of double churches which has received so much learned elucidation from Mr. Freeman.

E. V.

LIQUID FUEL.

THE use of petroleum or some other hydro-carbon of a similar character for the purpose of generating steam has attracted a good deal of attention lately, and many schemes have been brought before the public which their sponsors have boasted to have settled the question in favour of the liquid fuel. In spite of all that has been said and done, however, coal-owners have as yet no cause to tremble for the immediate future of the solid type of fuel, so far as heating purposes are concerned. The problem is mainly one of cost, for if as much heat could be generated by petroleum as coal, taking a unit of cost as a standard of comparison, there are many situations where the former would offer great advantages; amongst the most obvious being lighter weight, and ease in handling and stowing. Petroleum is, however, making rapid strides in the direction of reduced cost. The problem is mainly, if not entirely, one of transportation; and we learn some interesting facts on this head from a small handbook on the question written by Mr. B. H. Thwaite, F.C.S., and published by Spon.

In 1866, the total quantity of mineral oil exported from the oil-fields of the United States equalled 50,987,341 gallons. In the course of the next twenty-one years this quantity had increased about 900 per cent.,—the total exported in 1886 being 577,781,752 gallons. In 1866 the price was 89 cents a gallon, whilst last year it was 2·4 cents per gallon. Taking the specific gravity of oil to be 0·91, and the cost of delivery by projected pipe lines at 5 cents per barrel, free on board, Mr. Thwaite estimates the cost at 25s. per ton.

It is, however, to the great European oil fields of the Apsheron, or, as Mr. Thwaite spells it, Aspsheron peninsula, that attention has been most attracted of late. From the Russian source of supply we learn, from the handbook in question, that 2,748,304 gallons were exported in 1866, and in 1885 the production had increased to 396,000,000 gallons, although it should be stated that during the period embraced the Government monopoly was abolished, a fact Mr. Thwaite omits to notice. During the same period, Mr. Thwaite tells us, the price had receded from 2¼d. down to 0·118 of a penny per gallon. The latter is equivalent to 2s. 5d. a ton, but our contemporary *Engineering* stated in 1884 that crude petroleum was then selling at Baku for 3½d. a ton. These figures will give an idea of the proportion that transportation bears to the total cost of the material, although, of course, crude petroleum is by no means the material that is known to the consumer.

Unfortunately the oil-wells of the Apsheron peninsula are some distance from the coast, or at any rate from any coast-line having communication with the open sea, for the Apsheron is on the Caspian and 560 miles from Batoum, the nearest port on the Black Sea, with which town, however, there is railway communication. If the pipe-line from the Baku oil-wells to Batoum should ever be completed there may be a chance of getting crude petroleum to Western Europe, but at present the whole transporting plant is engaged in carrying refined petroleum. In America a pipe-line 210 miles long and 8 in. in diameter has lately been commenced, and is now being vigorously pushed forward towards completion. This is to take the crude oil from the Lima district to Chicago; and it is expected that, when complete, hundreds of factories in the latter city will give up using coal in favour of the crude hydro-carbon oil. The cost of the whole undertaking is estimated at 2,250,000 dollars. We have already a large number of steamers specially built for carrying petroleum in bulk (a difficult problem which the naval architect has solved), and Mr. Thwaite calculates that oil could be delivered in the United Kingdom at 1*l.* 10s. a ton were the pipe-line complete.

Seeing, therefore, that we are within measureable distance of getting petroleum at a much cheaper price, it remains to be seen how it can be burnt for heat-giving purposes; and it is here that we come to the object of Mr. Thwaite's publication. He is the inventor of a system by the use of which he claims the usual advantages of mineral oil fuel. The following is a condensed description of the arrangement:—The liquid hydro-carbon is injected by steam into the centre of a retort placed in the centre of the steam generator furnace; the steam and oil pass backwards and forwards through the retort, and become, on contact with its sides, converted into gas. The gas issues in an annular ring from the front end of the retort. Striking against a divert-plate, it returns around the outside edge of the retort, and is joined by an annular blast of air. In this way a hollow cylinder of flame is produced, in the centre of which is the retort. The whole is inclosed in a perforated lining of refractory material. By an equilibrium valve arrangement the required balance of air and gas can, it is said, be established; and so far is this successful that, we are told, a sheet of paper may be held over the chimney for an hour without being discoloured by soot.

The device appears to be a good application of a well-known principle, which has before been utilised for a similar purpose. We do not read that Mr. Thwaite has any special precautions for preventing clogging, a feature that has caused some trouble; and it would be interesting to know the life of a retort. The arrangement is, however, of special interest from the fact that some very detailed experiments have been made with it. Mr. Thwaite secured the use of a marine type of boiler 8 ft. 6 in. by 5 ft. 6 in. in diameter, and used his petroleum burner for raising steam. Scotch blast furnace oil was used first of all, and 14·97 lb. of water were evaporated from, and at 212 deg. Fahr. per lb. of fuel. This was equal to a net actual evaporative efficiency of 89·87 per cent. This was with the air for combustion supplied by natural draught. When a Körting injector was used the results were not quite so good. Were Russian petroleum residuum (astatki) used, Mr. Thwaite calculates, from analysis of that material, that 16·58 lb. of water would be evaporated at from 212° Fahr. per lb. of fuel,—calorimètric tests giving a result equal to 19·28 lb. of water evaporated under similar conditions. Finally, Mr. Thwaite brings his calculations to a commercial basis. One shilling's worth of coal at 15s. a ton would evaporate 1,215 lb. of water. A shilling's worth of blast furnace oil at 1*l.* 5s. a ton would evaporate 1,258 lb. of water. A shilling's worth of Baku astatki, delivered in the Mersey at 1*l.* 10s., of which 19s. is for freight and 11s. is the cost of oil at Batoum, would evaporate 1,238 lb. of water. One shilling's worth of Baku astatki, delivered free on board at Batoum at 10s. 11d. per ton, would evaporate 3,390 lb. of water. All at and from 212° Fahr.

Before, however, the last-named results can reached the pipe-lines must be completed, and when such an event takes place, and there is an outlet for the material, it is probable that the price of crude petroleum will advance considerably. A good deal of attention has lately been given by ironmasters to the possibility of using the by-products of coke ovens and blast furnaces, but the quantity of blast furnace oil obtained would be so small as to be of comparatively little consideration.

On the whole Mr. Thwaite's figures are promising, and certainly are of great interest, though they do not go all the way to elucidate the problem of liquid fuel.

The Late Mr. William Hay, Architect. This well-known Edinburgh architect, whose death took place last week, was (says the *Scotsman*) a native of Cruden, and came to Edinburgh as assistant to Mr. John Henderson, architect, in 1844. After being engaged with him some years, he became assistant to Sir Gilbert Scott, by whom he was sent to Newfoundland as clerk of works to the new cathedral there. At the completion of the works he removed to Canada, and commenced business in Toronto, where he had a considerable and varied practice, extending to Bermuda, which he had to visit on several occasions. In 1864 he resolved to return to Edinburgh, where he continued in practice, and ten years since he assumed Mr. W. Henderson as partner. He will be remembered by many in connexion with the restoration of St. Giles's Cathedral,—a work entrusted to him by the late Dr. Chambers. Immediately after this he proceeded again to Bermuda in connexion with the erection of a new Government House and a new cathedral, in place of Old Trinity Church, which had been destroyed by fire. For the last eight months, owing to illness, he has been unable to leave his residence at Joppa, where his death took place, in his seventieth year.

Illustrations.

DESIGN FOR A DETACHED BELL-TOWER.

THIS illustration, representing a design by Mr. J. Oldrid Scott, is from the drawing hung as No. 1773 in the present Royal Academy exhibition, and was commented on in our notice of the architectural drawings at the Royal Academy, page 353, *ante*.

LAUREL MOUNT, KEIGHLEY.

THIS house, designed by Mr. W. H. Sugden, has been recently carried out under his superintendence by local tradesmen.

The stone used for the walls is a sandstone of the district.

MEMORIAL ABOUT TO BE ERECTED AT WOKING.

THIS memorial is proposed to be executed in approved Ancaster stone on a granite substructure, the lower part being groined, and to have moulded ribs as shown in perspective. A monumental slab of Lizard serpentine with cross in bas-relief on a raised plinth will be enclosed in the same. The height to apex of gable is 18 ft., the figures at the angles being about life-size.

The architect is Mr. Myers Taylor.

A LIBRARY INTERIOR.

THE illustration gives a view of Mr. St. John Brenon's library, at No. 6, Gunterstone-road, Kensington, W., and shows a new window, added to the existing room, there being no other structural alteration. The question of cost had to be considered, as well as the accommodation of a very large collection of books, which last consideration had necessitated the room being entirely surrounded with book-shelves, partly enclosed with doors, and when the work is completed it is proposed to paint on those subjects of a suitable character. The woodwork is of deal throughout. Messrs. Excell & Lister are the builders, and Mr. W. Stirling is the architect. The drawing from which the illustration is taken is in the Royal Academy Exhibition.

CHISLEBOROUGH CHURCH.

IT is proposed to rebuild the chancel of this church, placing a vestry on the north side. The present chancel is little better than a barn. The new work of the chancel will stand on the same lines as the old, with the exception of being slightly diminished in length. The central tower and spire are old, the spire being a somewhat unusual feature in Somersetshire churches. Mr. R. W. Paul is the architect.

SCULPTURE: "CASSANDRA" AND "BARNES MEMORIAL STATUE."

THE first-named of these works, by Mr. G. A. Lawson, is in the Lecture-Room at the Royal Academy; it is a statuette of about one-third life size.

The other figure is a memorial portrait-statue of the late Rev. W. Barnes, the author of the beautiful "Poems in the Dorset Dialect," which, if not widely known to the general public, gained the sincere admiration and sympathy of a considerable circle of readers. The work is by Mr. E. R. Mullins, and is now being cast in bronze at Mr. Moore's foundry at Thames Ditton; it will be erected eventually on a site near the Museum in Dorchester, on a pedestal of stone from some native quarry.

The statue was promoted by a public subscription, raised by a committee of which the Bishop of Salisbury was chairman.

SCULPTURE: "MEDEA."

THIS is a work by Mr. Hamo Thornycroft, at present in the Royal Academy exhibition, and which is referred to in an article on "Sculpture at the Royal Academy" on another page.

The Greek and Roman Theatre.—We regret to hear that Sir Charles Newton has been obliged, through illness, to postpone (probably only for a week) his concluding lecture on the above-named subject, our report of which should otherwise have appeared this week.

"CASSANDRA;" STATUETTE.—Mr. G. A. Lawson, Sculptor.

"Ink-Photo," Sprague & Co. 22, Martins Lane, Cannon St, London, E.C.

MONUMENTAL STATUE TO THE LATE REV. WILLIAM BARNES,
THE "DORSETSHIRE POET."
Mr. E. Roscoe Mullins, Sculptor.

"CASSANDRA;" STATUETTE.—Mr. G. A. Lawson, Sculptor.

THE "DORSETSHIRE POET."

Mr. E. Roscoe Mullins, Sculptor.

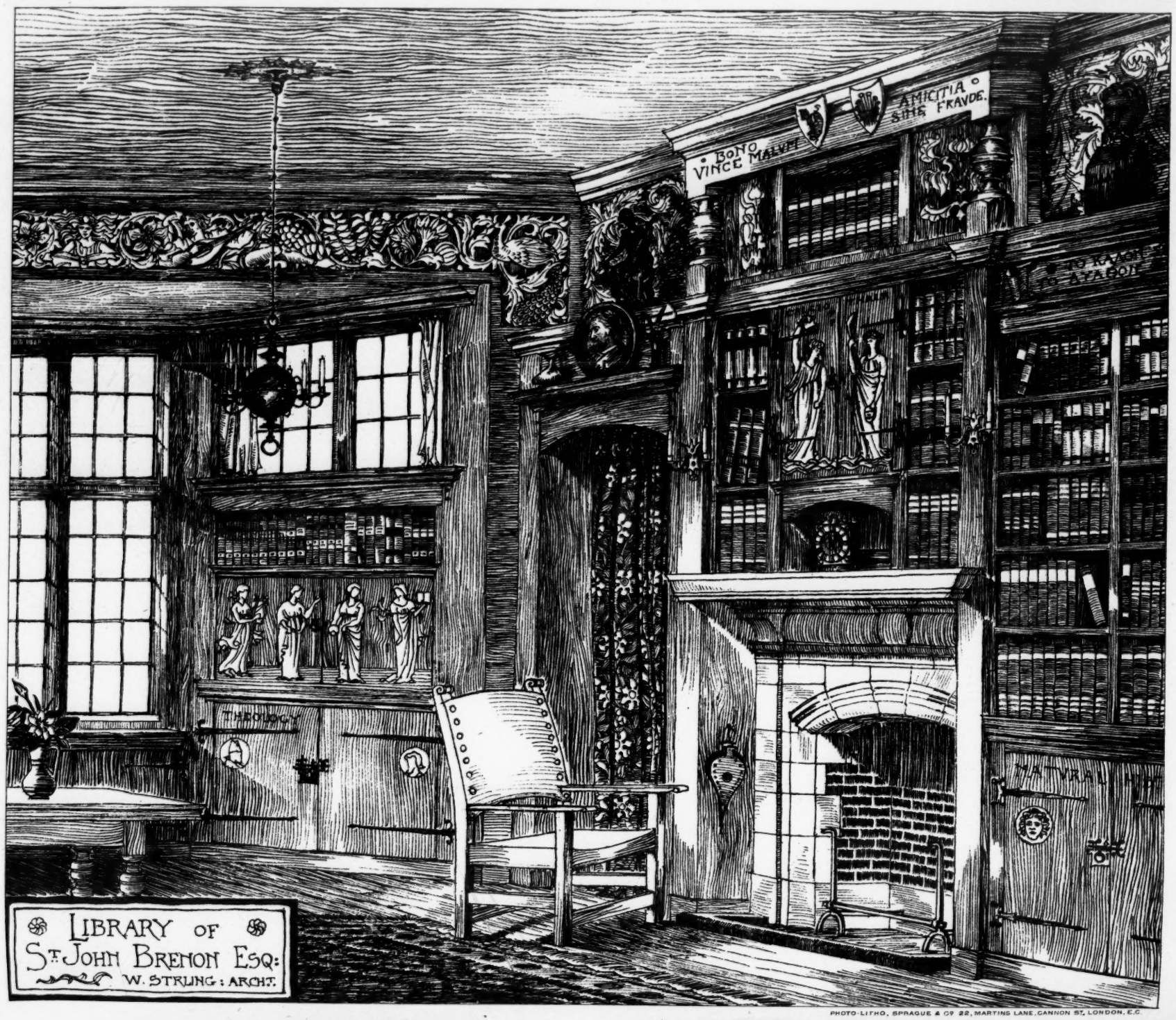


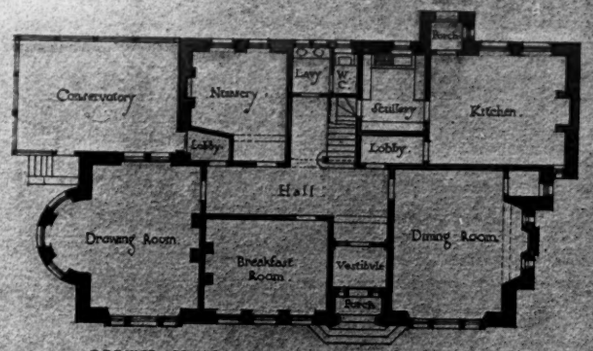
PHOTO-LITHO, SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

PHOTO-LITHO. SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

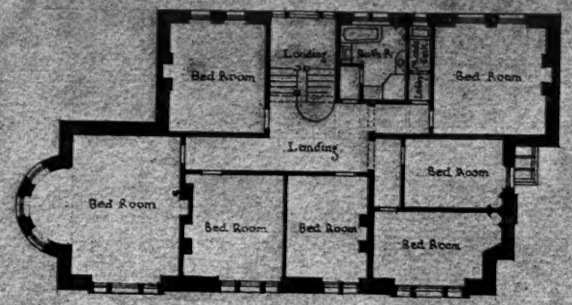
LAUREL MOUNT : KEIGHLEY :

IRA ICKRINGILL ESQ.

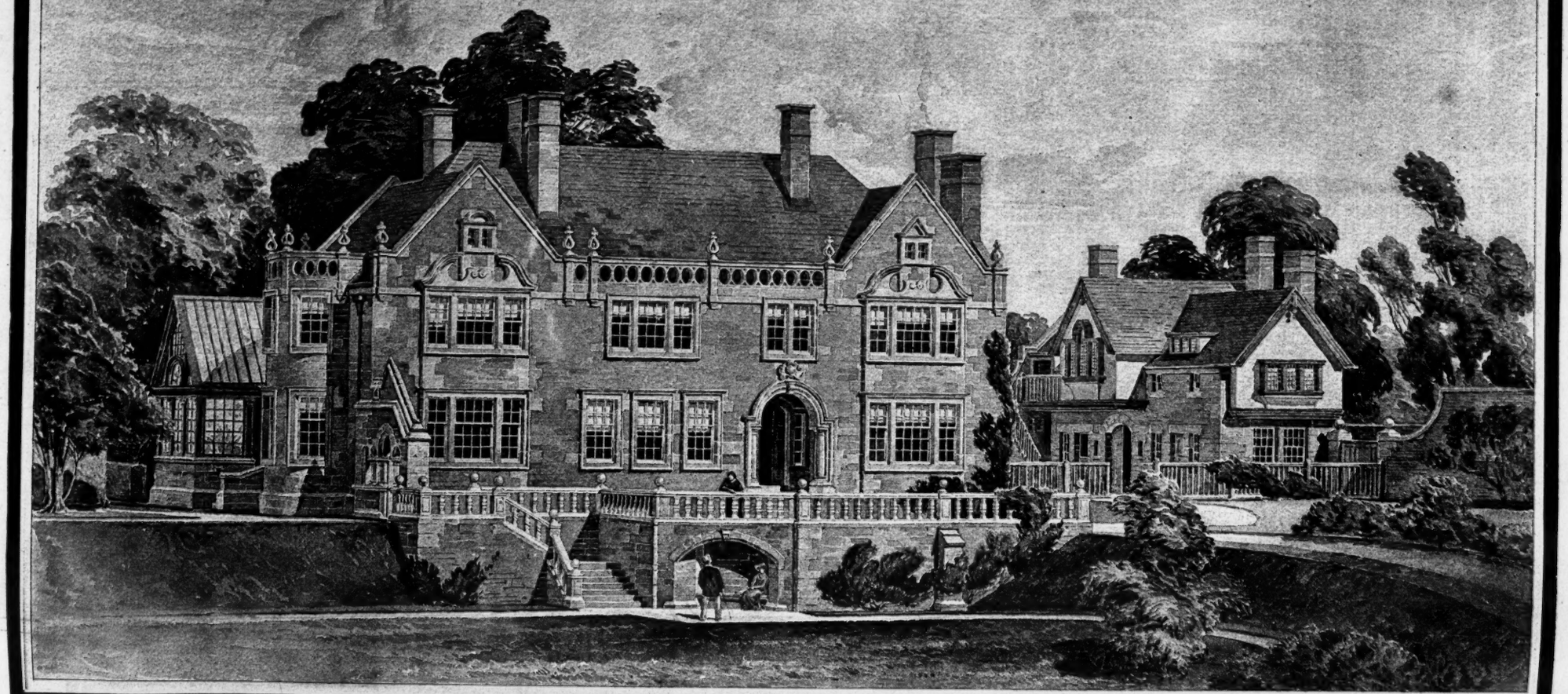
W.H. Sugden. Archt & Srl.
Keighley Nov. 1887



GROUND PLAN.

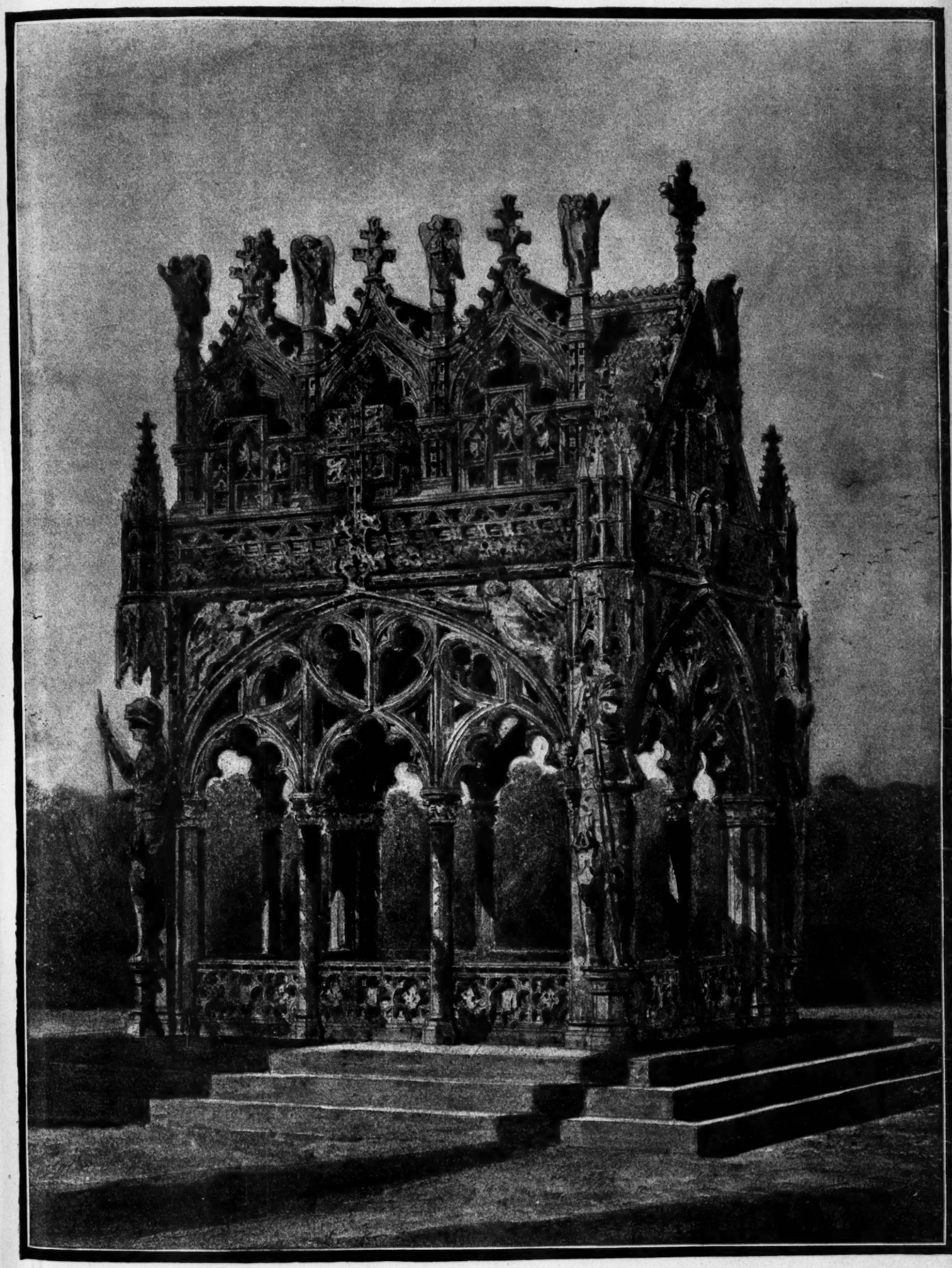


CHAMBER PLAN.



The Phototype Co., 308, Strand, London.

The Phototype Co., 303, Strand, London.



The Phototype Co., 303, Strand, London.

DESIGN FOR MONUMENT TO BE ERECTED IN WOKING CEMETERY.

MR. MYERS TAYLOR, ARCHITECT.

Chisleborough Church Somersetshire: New Chancel & Vestry.

Roland W. Paul, Archt.

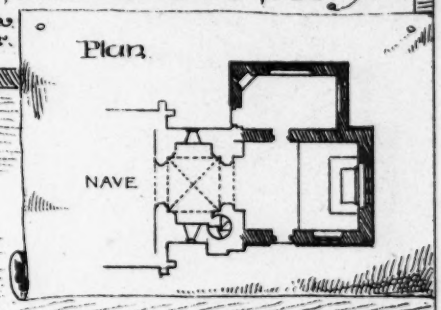
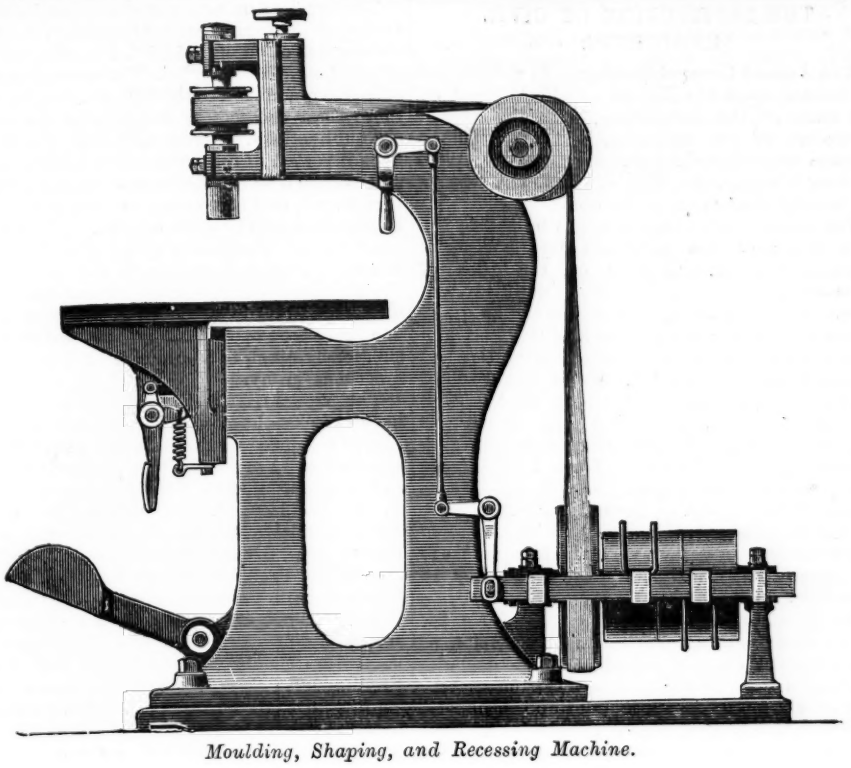


PHOTO-LITHO., SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

"INK-PHOTO," SPRAGUE & Co. 22, MARTINS LANE, CANNON ST, LONDON, E.C.

"MEDEA."—MR. HAMO THORNYCROFT, R.A., SCULPTOR.



Moulding, Shaping, and Recessing Machine.

MOULDING, SHAPING, AND RECESSING MACHINE.

WE illustrate herewith a newly-designed overhanging, vertical spindle, moulding, shaping, and recessing machine, recently introduced by Messrs. M. Powis Bale & Co., Appold-street, Finsbury, E.C.

It is adapted for cutting circular or straight mouldings, or twisted handrails; sticking circular and straight sash bars; moulding, rebating, and grooving straight or circular sash-frames; moulding raised door panels; moulding, chamfering, or recessing ornamental stall ends; housing string-boards, &c. The main frame of the machine is a cored casting made in one piece. The cutter spindle is of steel, and speeded to make some 3,500 revolutions per minute; it is adjusted vertically, and arranged to reverse instantly, so that the cutters may always act with the grain of the wood. In working ornamental mouldings the wood is secured to a template of the required form, and placed on the table. The table is raised, and the wood brought under the action of the cutters by means of a treadle, and a spring stop is so arranged that the ascent of the table may be checked as required. The lever operating the spring stop is moved by the knee of the workman, and is under his immediate control. Either ordinary flat or solid saucer-shaped cutters, with the profile of the desired moulding formed on the periphery, may be used.

THE IRISH EXHIBITION IN LONDON.

THE Irish Exhibition in London, opened on Monday last, claims to be fully representative of all the manufactures, industries, and art of Ireland. It is the first exclusively Irish Exhibition held in London, and is officially stated to be larger and more comprehensive than either of the Exhibitions held in Ireland. How far these statements go visitors on the opening day were not fully enabled to judge, for the Exhibition was, like so many of its forerunners in London and elsewhere, in a very chaotic and incomplete condition. It is but just to say that the exhibitors have had a very short time in which to prepare, pack, transport, unpack, and arrange their exhibits. The processes of unpacking, erecting, and otherwise displaying exhibits was in full swing on Monday, and is likely to last a few days longer, but when all is ready the Exhibition promises to be very interesting and instructive, and we wish it all the success that its promoters aspire to achieve.

It is often said, and no doubt correctly, for the statement is repeated in the introduction to the catalogue of the Exhibition, that Ireland possesses great natural resources and extensive industries which have not as yet been utilised to the full.* To promote their more complete utilisation, the Irish Exhibition has been undertaken, with these considerations:—"(1) To place before the English public a clear view of the predominant industries of Ireland. (2) To awaken public interest in the efforts being made to revive her trade. (3) To exhibit to the many thousands of persons in England who have never crossed the Irish Channel somewhat of her deeply-interesting historical and antiquarian treasures. (4) To illustrate the worth and significance of Irish Art; and, finally, to help to moderate prejudices which, frequently tending to fetter the judgment, are at the very root of misunderstandings between people and people." A happy augury for the attainment of the end last named is that the Irish Exhibition is promoted by distinguished men of all parties and creeds,—people who, differing widely on political and other matters, forget their differences in a common effort to promote the industrial welfare of Ireland, with which that of England is closely connected, as was appositely pointed out by the Lord Mayor of Dublin in his eloquent speech on the occasion of the opening ceremony. "It is good," he said, "neither for Ireland nor for England, that fabrics made in Ireland should be exported from Ireland to the Continent, and re-exported from the Continent to England, in the guise of foreign-manufactured goods. This system injures Ireland, because it deprives her of the credit due to her for her productions, which ought to be a valuable element in her home trade with England. But it is an injury to England also, because it deprives the English buyer of the privilege of buying in the cheapest market." It is also stated to be one of the objects of the present Exhibition to promote the success of the Irish Exhibition to be held in Dublin next year.

The Irish Exhibition in London is being held at "Olympia" (otherwise the National Agricultural Hall), Kensington, to which there is good railway access from all parts of the kingdom to the very doors, for the main entrance to the building is opposite Addison-road Station. The large exhibition hall and its wide galleries, are wholly given up to the purposes of the Exhibition proper. In the stables at the western end of the hall there are stalled a large number of the pretty little Kerry cows. These stables, it should be mentioned, form a large arc or semicircle on plan, and on the open space between the stables and the hall a large corrugated iron building has been erected for the purposes of the Irish Dairy. This, however, is not yet occupied, but the Rev. Canon Bagot, whose efforts in the improvement of dairy farming and produce are so well known and recognised by agriculturists, has arrived, and he promises to have the dairy in working order very soon. The Canon proposes to give a regular series of lectures on dairying, which will be illustrated with demonstrations. Expert Irish dairy-maids, in native costumes, are coming over, and advantage is to be taken of this opportunity, we are told, to train English girls in Irish dairy work. Canon Bagot, in a short but humorous speech delivered on Monday, said that no butter in the world equals Irish butter; why, then, he asked, eat Danish, Dutch, and even Italian butter? Probably, he said, because Irish butter, properly made, was practically unknown to English consumers. He hoped the Irish Dairy at the Exhibition would do a good deal to alter this state of things.

The *al-fresco* element, which seems now to be an indispensable concomitant of all large exhibitions held in the summer months, is not forgotten, for the grounds or gardens of "Olympia," which cover nearly six acres, are being laid out with flower-beds, rockwork, fountains, &c. These grounds are approached from the main building by means of a short subway, which is so contrived as to appear to be hewn out of the solid rock. The illusion would be perfect but for the under-side of an iron girder bridge which forms the roof of the subway, and which, possibly, has yet to be disguised, for the work here, as elsewhere, is not complete yet. In the gardens some of the most attractive features of the Exhibition will be found, for, in addition to military bands (the fine bands of the Royal Inniskilling Fusiliers and the Connaught Rangers are there this week), illuminated fountains, and "fairy lamps," there will be "a limestone cave dug out of the earth," "an exact representation of the only remaining Tower of Blarney," and representations of an ancient Irish round tower, a farmyard and homestead, and an Irish castle,—with portcullis, drawbridge, moat, fortifications, and trenches. Of these and of the representations of the buildings forming the Irish Village, Mr. George H. Birch, F.S.A., who designed the "Old London" street at the "Healtheries" series of exhibitions, is the architect, and it may therefore be safely assumed that the buildings represented are copied with fidelity and archæological accuracy. The Irish Village will consist of a dozen cottages "built and thatched by native workmen in true Donegal fashion." They will be arranged so as to form a picturesque village-street, irregular in plan. "In the centre of the street will be a veritable cross brought over from Ireland. At the western part of the village, facing the visitor on entering, will be the ruins of an Irish tower." The cottages themselves will be (some of them already are) occupied by native Irish workers. The processes to be illustrated in this Donegal industrial village will be dyeing, carding, spinning, and weaving by hand of homespuns and of linens; the weaving of damasks, lace-making, sprigging, knitting, hemstitching, and the Kells embroidery. These processes are for the most part included in the Women's Art and Industries Section of the Exhibition, which is one of the most practically useful and best-represented sections. There are thousands of industrious Irish peasants, able and willing to produce lace, embroidery, knitted work, &c., but they can at present find no ready market for such productions, and they are too poor to pay the expenses of a stall and attendants. It is stated that the Council of the Exhibition have voted funds to erect stalls in the attractive form of an old Irish market-place, and that they will also pay for the attendants. In July a fashionable *Fête* is to be organised in this market-place. The Donegal Industrial Village, it should be mentioned, has been organised by Mrs. Ernest Hart and Lord Leitrim. In the cottages on the right are housed a spinner and weaver, brought from the remote village of Gweedore, in county Donegal, busy making homespuns. It is stated,—and it is a striking testimony to the need of more enterprise in developing Irish industries,—that "so primitive were these people's appliances when Mrs. Hart first began her work among them, that spinning with the wee wheel, as it is called, had to be taught to displace the

* A very good idea of the natural and industrial resources of Ireland may be obtained from the Report of the Executive Committee of the Cork Industrial and Fine Art Exhibition, held in 1883. This book (published in 1886 by Messrs. Purcell & Co., Patrick-street, Cork) contains a very valuable report of 260 pages by Dr. W. K. Sullivan, President of Queen's College, Cork, on the material resources of the country, besides a great deal of other useful information. It is a book which may be profitably studied by all who are interested in the development of the industrial resources of Ireland.

more cumbersome and less exact method of spinning with the large wheel, in which only one hand is free to manipulate the thread. The spinner is one of the girls thus taught, and the wheel on which she spins is one of those now being introduced into Gweedore. This novelty in this far-away district is in truth so old-fashioned, that it went out of use in England about sixty years ago." The weaver has brought with him his old primitive loom, which Mrs. Hart is now replacing in the country by greatly-improved hand-looms of modern construction. At one of the cottages a little further on will be found a woman at work, dyeing wool from wild Donegal plants ready for the carders' and spinners' use. This side of the street will be alive with the noise of the looms and spinning-wheels, for we can pass from the cottage of the Donegal weaver into that of a linen weaver and spinner brought from Armagh, where, on the property and through the agency of Mrs. Cope, the Donegal Industrial Fund has founded a small industry for making their artistic embroidery linens by hand. At the village store at the head of the street, orders may be given for the articles made in the village. The main object which has been held in view in illustrating and encouraging these hand industries is to enable the small cottier, of whom there are so many thousands in Ireland, and especially in the north-west, and whose little plot of land is in itself insufficient to maintain life, to supplement by hand-work the scanty earnings of agricultural labour. The earnings of the wife and girls are especially important in helping to raise the standard of existence in these distant parts of Ireland, and to give something like a reasonable outlook for defence against the frequently-recurring destitution, which has so often proved calamitous in these districts. Mrs. Hart informs us that the people have shown themselves remarkably intelligent, quick to learn, industrious, and well conducted, and their products, which are continuously on sale at the permanent depôt of the Donegal Industrial Fund, 43, Wigmore-street, are stated to have been received with constantly-increasing favour by the trade and by the public. Of course the *al fresco* portion of the programme would be incomplete without the now inevitable "switch-back" railway, and there it is, in close proximity to the "Old Irish Castle," which latter,—like the round tower and other erections already completed,—is very well done.

The official catalogue (which, by the way, is of about the same size as the Royal Academy catalogue, and is to be had for 6d.) sets the good example of being a catalogue simply, and not a catalogue *plus* a large number of advertisement pages. As a matter of fact, it does not contain a single advertisement, and even the covers are unappropriated by soap-makers and cocoa-manufacturers,—a welcome relief. (We hope we are not premature in saying this, and that our copy is a complete one. Some people, we know, will only see, in an official catalogue devoid of advertisements, a proof of the alleged absence of business qualities in the Irishman. "What a golden opportunity for money-making has here been lost!" they will exclaim. In our opinion the Council of the Irish Exhibition are to be commended for taking a new and much-needed departure in this matter.) The names of more than 500 exhibitors appear in the catalogue.

The exhibits on the floor of the great hall are very varied in character, and include pretty well everything eatable, drinkable, wearable, or usable, which is in any way the product of Ireland or of Irish industry and skill. Judging from the Catalogue, there will be a fairly good display of Irish granites, marbles, and other building materials, but we defer noticing these and other exhibits until they are all actually on exhibition, which was not the case on Monday. The Exhibition promises to be not the least popular and successful of the exhibitions now open in London. It is to remain open until the 27th of October.

Trawsfynydd Church, Merionethshire. A stained-glass window, having for its subject "Our Lord's Charge to St. Peter," has been placed in this church, as a memorial to the late Vicar. The work was designed and executed by Messrs. Warrington & Co., of Fitzroy-square.

A new Presbyterian Church, to seat 600 people, is about to be erected in Willesden-lane, Brondesbury, from the designs of Mr. Henry S. Tyack, architect.

THE INSTITUTION OF CIVIL ENGINEERS.

THE Annual General Meeting,—to receive and deliberate upon the Report of the Council on the state of the Institution, with the annual statement of the accounts, and to elect the Council and officers for the ensuing year,—was held on Tuesday, the 29th of May, Mr. George B. Bruce,* President, in the chair.

The Report stated that it would be within the recollection of the members that a Special General Meeting was held on the 16th of November, 1886, at which a petition was adopted praying the Queen in Council to grant to the Institution a Supplemental Charter. In answer to this application, the Institution had received Letters Patent, dated the 3rd of August, 1887, under the Great Seal of the United Kingdom, extending the power to acquire and hold a hall, messuages, lands, tenements, and hereditaments, from 1,000*l.*, —as authorised by the original Charter,—to a sum not exceeding 8,000*l.* in annual value. A copy of this Supplemental Charter had been sent to every member, together with the biennial issue of the original Charter, By-Laws, and List of Members.

At Midsummer last, the freehold of No. 24, Great George-street, embracing the portion of the premises already occupied on lease, was purchased for 15,000*l.* The Institution was now the owner of three contiguous houses, obtained at a cost of 40,000*l.*, exclusive of legal and incidental expenses. In accordance with the recommendation of the last Council, openings had been made between the basements, the ground-floors, and the first floors of Nos. 24 and 25.

The Council had presented a petition against the Westminster (Parliament-street, &c.) Improvements Bill, which contemplated taking by compulsion the freehold premises above referred to. The result of this petition was the insertion in the Act,—which received the Royal Assent on the 23rd of August, 1887,—of clauses for the protection of the Institution, the substance of which was as follows:—The conveyance to the Institution of the fee-simple in possession of a plot of land on the northern side of Great George-street, having an area of 11,000 square feet; the payment of a sum of 35,000*l.* as full compensation for the buildings, and for all consequential damage; the use of the present premises for eighteen months after possession had been given of the substituted site and the above payment had been made; and unless within one month after the expiration of twelve months from the passing of the Act a sum of 10,000*l.* should be paid to the Institution as security, the powers of the Act, so far as the Institution was concerned, would lapse. Up to this time, no intimation had been received whether the powers of the Act were to be put in force.

Communications having been received from a committee promoting the registration of architects, engineers, and surveyors, inviting the Council to offer suggestions upon a draft Bill to be brought forward this session, that committee was informed that the Council did not intend to take any part in furthering the proposed measure. Later on, however, it became evident that active steps must be taken to oppose the Bill, which vitally affected the interests of the Institution, as well as those of the cognate bodies representing architects and surveyors. On behalf of the Institution a statement of reasons against the measure was drawn up, and this formed the basis of a petition to the House of Commons, which was duly presented by Mr. A. Giles, M.P., V.P. Inst. C.E. As the provisions of the Bill became better known, opposition increased in various other quarters, and, on the second reading, the opinion of the House was so clearly opposed to the Bill that its promoters withdrew it rather than risk a division.

During the twelve months ended the 31st of March, 1888, there had been an addition to the roll of forty-nine Members and of 183 Associate-Members, the number of non-corporate Associates being reduced by twenty-three. The increase had been 4·6 per cent. per annum, as compared with 4·19 per cent. for the previous twelve months. The Students had increased by twenty-five. At the date named there were on the books 1,617 Members, 2,458 Associate-Members, 461 Associates, 20 Honorary Members, and 974 Students,—together 5,530.

* We are pleased to see that it is announced that Mr. Bruce is to receive the honour of knighthood.

The receipts on account of income during the twelve months under review were 16,071*l.* 12s. 2d.; on account of capital, 4,248*l.* 11s. 2d.; and from trust funds, 433*l.* 15s. 1d. The general expenditure had amounted to 13,956*l.* 10s. 10d., of which more than one moiety constituted the cost of the publications. A sum of 6,476*l.* 18s. 9d. had been invested in the purchase of 5,000*l.* London and North-Western Railway 4 per cent. Debenture Stock, and the outlay on account of trust funds amounted to 476*l.* 6s. 11d. These figures constituted the ordinary receipts and disbursements. Owing, however, to the purchase of No. 24, Great George-street, it had been necessary to sell railway debenture stocks of the nominal value of 9,000*l.*, and to transfer from the yearly receipts a sum of 4,617*l.* 11s. 3d., to meet this outlay.

The papers read at the ordinary meetings had been of more than usual interest, and had given rise to animated discussions and to much correspondence. For some of the papers the Council had awarded medals and premiums to Messrs. R. A. Hadfield, P. W. Willans, Dr. Edward Hopkinson, Messrs. E. B. Ellington, Josiah Pierce, jun., Sir Bradford Leslie, K.C.I.E., and the Manby Premium to the late Mr. Hamilton Goodall. For papers printed in the "Proceedings" without being discussed a Watt Medal and a Telford Premium had been awarded to Professor Dwelshauvers-Déry, and Telford Premiums to Messrs. W. M. Thompson, J. W. Wyatt, and D. Drummond. Advantage had been taken of the increased accommodation to hold exhibitions of models, appliances, instruments, and specimens in connexion with some of the subjects which came under discussion, viz.:—"Accidents in Mines," "Manganese-Steel," and the "Use of the Plane-Table in Topographical Surveying." The success of these exhibitions had formed a most acceptable feature of the Tuesday evening meetings of last session, and it was hoped that they might be repeated and further developed as opportunity occurred.

There had been twelve supplemental meetings for students, held on Friday evenings, generally at fortnightly intervals. Three of the papers read and discussed had already appeared in the "Proceedings," and five others had been deemed worthy of publication. The Council was glad to notify a distinct advance in the general care and attention devoted to the preparation of these papers, and in the thoughtfulness manifested, as a rule, by those of the students who had taken part in the discussions. Miller Prizes had been awarded to Messrs. D. S. Capper, L. Gibbs, H. M. Martin, J. H. Parkin, A. Chatterton, J. Holliday, A. W. Metcalfe, and R. J. Money.

In conclusion, the Council had noticed with pleasure the part taken in the discussions at the ordinary meetings during the past session by the younger members of the profession, which promised well for the future reputation of the Institution and of its Proceedings.

The adoption of the report was moved, seconded, and carried, and it was ordered to be printed in the Minutes of Proceedings. Hearty votes of thanks were then passed to the President, to the Vice-Presidents, and other Members of the Council, to the Auditors, to the Secretaries and staff, and to the Scrutineers.

The ballot for Council resulted in the election of Mr. G. B. Bruce, as President; of Sir John Coode, Mr. G. Berkley, Mr. H. Hayter, and Mr. A. Giles, M.P., as Vice-Presidents; and of Mr. W. Anderson, Mr. B. Baker, Mr. J. W. Barry, Sir Henry Bessemer, F.R.S., Mr. E. A. Cowper, Sir James N. Douglass, F.R.S., Sir Douglas Fox, Mr. C. Hawksley, Mr. J. Mansergh, Mr. W. H. Preece, F.R.S., Sir Robert Rawlinson, K.C.B., Sir E. J. Reed, K.C.B., F.R.S., M.P., Mr. W. Shelford, Mr. F. C. Stileman, and Sir William Thomson, F.R.S., as other Members of the Council.

The session was then adjourned until the second Tuesday in November, at eight p.m.

The Council has awarded the following Premiums for some of the Original Communications presented during the past Session, on account of the science, talent, or industry displayed in the consideration of the several subjects dealt with, viz.:—

For Papers Read and Discussed at the Ordinary Meetings.

A Telford Medal and a Telford Premium to Robert Abbott Hadfield, Assoc. M. Inst. C.E., for his Papers on "Manganese in its Application to Metallurgy" and "Some Newly-discovered Properties of Iron and Manganese."

A Watt Medal and a Telford Premium to Peter William Willans, M. Inst. C.E., for his Paper on "Economy-Trials of a Non-condensing Steam Engine, Simple, Compound, and Triple." (Has previously received a Telford Medal and a Telford Premium.)

A Telford Medal and a Telford Premium to Edward Hopkinson, M.A., D.Sc., Assoc. M. Inst. C.E., for his Paper on "Electrical Tramways: the Bessbrook and Newry Tramway."

A Watt Medal and a Telford Premium to Edward Bayzand Ellington, M. Inst. C.E., for his Communication on "The Distribution of Hydraulic Power in London."

A Telford Medal and a Telford Premium to Josiah Pierce, jun., M.A., Assoc. M. Inst. C.E., for his Paper on "The Economic Use of the Plane-Table in Topographical Surveying."

A George Stephenson Medal and a Telford Premium to Sir Bradford Leslie, K.C.I.E., M. Inst. C.E., for his account of "The Erection of the 'Jubilee' Bridge, carrying the East Indian Railway across the River Hooghly at Hooghly." (Has previously received Telford and Watt Medals and Telford Premiums.)

The Manby Premium to the late Hamilton Goodall, Assoc. M. Inst. C.E., for his Paper on "The Use and Testing of Open-hearth Steel for Boiler-making."

For Papers Printed in the Proceedings without being Discussed.

A Watt Medal and a Telford Premium to Professor Victor Auguste Ernest Dwelshauvers-Déry, for his Paper on "A New Method of Investigation applied to the Action of Steam-Engine Governors."

Telford Premiums to William Mann Thompson, M.A., B.E., Assoc. M. Inst. C.E., for his Paper on "Improved Systems of Chaining for Land and Engineering Surveys"; to James William Wyatt, F.C.H., Assoc. M. Inst. C.E., for his Communication on "Sizing Paper with Rosin" (has previously received a Telford Premium); and to Dugald Drummond, M. Inst. C.E., for his Paper on "The Heating of Carriages by Exhaust Steam on the Caledonian Railway."

For Papers Read at the Supplemental Meetings of Students.

Miller Prizes to David Sing Capper, M.A., Stud. Inst. C.E., for his Paper on "The Speed-Trials of the latest addition to 'The Admiral' Class of British War-Vessels" (has previously received a Miller Prize); to Lawrence Gibbs, Stud. Inst. C.E., for his Account of "Pumping-Machinery in the Fenland and by the Trentside"; to Harold Medway Martin, Wh.Sc., Stud. Inst. C.E., for his Communication on "Arched Ribs and Voussoir Arches"; to John Henry Parkin, Stud. Inst. C.E., for his Paper on "River-Gauging at the Vyrnwy Reservoir"; to Alfred Chatterton, B.Sc., Stud. Inst. C.E., for his Paper on "The Prevention and Extinction of Fires" (has previously received a Miller Prize); to John Holliday, Stud. Inst. C.E.,* for his Paper on "Boiler Experiments and Fuel-Economy"; to Arthur Wharton Metcalfe, Stud. Inst. C.E.,* for his Paper on "The Classification of Continuous Railway-Brakes"; and to Robert Jarratt Money, Stud. Inst. C.E.,* for his Account of Railway Engineering in British North America."

* Since elected Associate-Members.

[It has been determined to print the last-named eight Papers, either in whole or in part, in the Minutes of Proceedings.]

THE ACTON MAIN DRAINAGE WORKS.

SOCIETY OF ENGINEERS.

AT a meeting of the Society of Engineers, held at Westminster Town Hall, on Monday evening, June 4th, Mr. A. T. Walmisley, President, in the chair, a paper was read on "The Acton Main Drainage Works," by C. Nicholson Lailey.

A special interest attached to this paper, on account of its containing a full description of the application of the system of the International Purification Company, which system Acton is the first town to adopt.

After glancing historically at the origin of the Acton drainage works, and showing that neither a sewage-farm nor the lime process were admissible, the site of the works being near the Bedford Park Estate, and close to an intended public recreation ground, a position which made the entire absence of foul odours, as well as a clear and pure effluent, absolutely essential, the paper gave an account of the formation of the sewers under disadvantageous circumstances, and the details of the works. These are situated on a triangular piece of ground about five acres in extent, and comprise precipitating tanks, the chemical buildings, and the pumping station.

The drainage of Acton is divided into two sections, a high and a low level. The high-level sewage flows into the precipitating tanks by gravitation, but the low-level requires pumping. Underneath the pumps is a storage tank for the low-level sewage, capable of holding 50,000 gallons. The precipitating tanks are three in number, and will hold 138,000 gallons of sewage each. In addition to these are two smaller tanks, one of which contains the magnetic spongy carbon filter bed, and in the other it is intended to construct another similar filter when increased population renders it necessary.

The "magnetic process" consists: 1, in precipitation of the solids; and 2, in filtration of the effluent through a bed containing a layer of "magnetic spongy carbon." This "magnetic carbon" is a hard material of such remarkable oxydising and aërating powers, that the effluent, after passing through it, is, to quote an independent report of Dr. E. L. Jacob, Medical Officer of Health to the Surrey Combined Sanitary District, "superior to many potable well waters." The precipitant used is magnetic ferrous carbon, and the mode of applying it is to grind it up into a thin slurry with water or sewage, and then to run this liquor into the sewage as it flows into the precipitating tanks. After allowing the sewage in the tank to settle for about three hours, the effluent is passed through the magnetic spongy carbon filter bed, from which it issues, according to the author of the paper, in a state of almost perfect purity and flows into the Thames. The sludge, which is very dense, is then drawn off into the sludge well, whence it is pumped into the presses. The amount of sludge obtained per week is eighteen tons, and, when pressed, this gives 4 tons 10 cwt. of sludge cake, which has all been sold up to date, and fetches 30s. per ton.

The author considered the magnetic process advantageous over all others, because the effluent is not spoilt by the use of lime, the manurial value of the sludge is much increased, the nuisance which exists at most sewage works where lime is used is not created, the Thames is not polluted by it. The Acton Local Board had at first grave doubts of the efficacy of any filtering bed for sewage, but experiments for a period of nine months convinced them that the "magnetic process" was all that could be desired, and they consequently entered into a contract with the International Purification Company for the supply of their material for a term of five years. The author and the Acton Local Board pride themselves that after careful investigation they have selected not only the most recent, but what they believe to be the most highly-developed of modern sewage processes, at once the most perfect and the most economical. In the tanks the solids are removed and the fluid defecated and deodorised, and in the filter-bed the deodorised fluid is purified from the organic matter in solution, so that the effluent produced is the most perfect yet obtained; and these advantages are had without the great expense attending the use of land for a sewage farm, which, they contend, is no longer a necessity.*

* We gave a description of the works last year (see *Builder* for Sept. 3, 1887, p. 326, and Nov. 5, p. 629), the last-named reference relating to a visit of inspection made by the Society of Engineers.

ILLEGAL REMUNERATION OF TOWN SURVEYORS.

WHITELEY *v.* BARLEY.

THIS case, which is one of great importance to Borough Surveyors and kindred officers, and which involves a hardship upon which we commented at the time of the first trial of the case last year,† came up again in the Court of Appeal on Tuesday last, before the Master of the Rolls, Lord Justice Lindley, and Lord Justice Lopes. It was an appeal by the defendant from a decision of Mr. Justice Mathew. The following report is taken from the *Times* of Wednesday:—

The action was brought against the Town Surveyor of the Corporation of Margate to recover, under section 193 of the Public Health Act, 1875, penalties in respect of three contracts entered into by the Corporation in 1884 and 1885 for the sewering and paving of new streets. The defendant had been employed to take out the quantities, and it was provided in each contract that for this service he should be paid at the rate of 2½ per cent. on the amount of the contract. This amount the contractor was to receive upon obtaining the defendant's certificate that the works had been completed to his satisfaction. The plaintiff further claimed penalties in respect of seven contracts entered into by the Corporation for the construction of sewage works. The defendant had prepared a scheme, and had been appointed by the Corporation to be engineer to superintend the works. A special resolution had been passed by the Corporation allowing him percentages on the sums to be paid for the works. Under these contracts he was to receive a commission of 1½ per cent. for taking out the quantities. Mr. Justice Mathew held that the defendant was "concerned or interested" in the contracts within the meaning of Section 193 of the Public Health Act, 1875, and that he had, therefore, incurred the penalties, to the amount of 200*l.*

The defendant appealed from this decision.

Mr. Tindal Atkinson and Mr. Crispe (Mr. Finlay, Q.C., with them) contended for the defendant that taking out the quantities and superintending the drainage works were outside his ordinary duties as surveyor. The Corporation could therefore make him allowances in respect of them. The contracts to pay him percentages were really the same thing as if the Corporation were to pay the percentages direct.

Mr. Kemp, Q.C., and Mr. H. F. Dickens, for the plaintiff, were not called upon to argue.

The Court dismissed the appeal.

The Master of the Rolls said that there was no impeachment of the honour or integrity of the defendant, but he was within the terms of the section. The question was whether he could have recovered this percentage in any other way than by the contract. It was clear that he could not. He was, therefore, interested in the contract, and his position was such as the section struck at. The object of the section was to guard from temptation those officials who might be weak enough to yield to it. The work done was no part of the defendant's ordinary work as Town Surveyor, nor was he to be paid for it by the Corporation. The only way in which he was to be paid for it was by a commission from the contractors. The case was, therefore, clearly within the section, and the judgment must be affirmed.

Lord Justice Lindley regretted that he was compelled to arrive at the same conclusion. The circumstances were such that it was impossible to say that the defendant was not "concerned or interested" in these contracts. His interest was palpable and unmistakable. An allowance over and above his salary, which gave him an amount varying with the amount of the contract, was sufficient to bring him within the terms of the section.

Lord Justice Lopes was of the same opinion. The case clearly fell within both the language and the mischief of the section. In his opinion, even if the percentage had been payable by the Corporation instead of by the contractors, the section would equally apply.

† See *Builder*, December 10th, 1887, p. 795.

CONTRACTS AND SUB-CONTRACTS.

HORTON *v.* NELSON.

IN the Queen's Bench Division of the High Court of Justice, on the 1st inst., before Mr. Justice Manisty and Mr. Justice Hawkins, sitting as a Divisional Court, the case of Enoch Horton (trading as Horton & Son) *v.* T. Nelson & Co., was heard. It was an action to recover 6,286*l.* 13s. 4d. balance alleged to be due under contracts for the supply of ironwork at New-street Railway Station, Birmingham, and Bethesda Railway Station, near Bangor. By an order of Mr. Justice Kekewich, a special case had been stated for the purpose of raising a preliminary question of law, the decision of which would materially affect the ultimate issue. It seemed that by two contracts, made on the 16th of November, 1882, the plaintiff undertook to supply and erect certain ironwork, and the contract relating to roofing, provided that the whole of the work should be carried out and completed in terms of and in accordance with the drawings and specifications of the London and North-Western Railway Company; whilst the contract referring to bridges provided, in addition, that should this particular work be of a different nature from that at the station, the question of difference of price should be left to the decision of Mr. Francis Stevenson, or the engineer-in-chief for the time being of the company. The fact was, as the plaintiff knew, that these contracts were sub-contracts to carry out a portion of the work comprised in a contract which the defendants had themselves entered into with the London and North-Western Railway Company. The specifications in the contract of the defendants with the Company provided that the decision of Mr. Stevenson with respect to the amount, state, and condition of the works actually executed, and also with regard to any question that might arise concerning the construction of the contract, tender, specifications, or the execution of the works, or any other matter, should be final and binding on the contractor and the Company without appeal. The question for the opinion of their lordships was whether this latter provision was to be considered as incorporated into the sub-contracts of the plaintiff. The plaintiff contended that it was not, but that he was entitled to be paid for the work which he actually did, and was in no way affected by any decision of Mr. Stevenson, unless given in accordance with the conditions of the sub-contracts. The defendants, on the other hand, maintained that the provision was incorporated into and formed part of the sub-contracts; that the plaintiff was, therefore, only entitled to recover in respect of work for which the defendants were in turn entitled to recover from the railway company. It was added that although before entering into the sub-contracts, the plaintiff had not seen the specification in the principal contract, he had himself tendered for part of the work indicated in them.

Mr. Jelf, Q.C., and Mr. Hugo Young were counsel for the plaintiff; Mr. Gully, Q.C., and Mr. Ernest Page representing the defendants.

At the conclusion of the arguments,

Mr. Justice Manisty said he was of opinion that the plaintiff's contention was right.

Mr. Justice Hawkins concurring, judgment was given for the plaintiff. Their Lordships expressed a strong opinion that the action ought to be referred to arbitration.—*Birmingham Gazette.*

CASE UNDER THE METROPOLITAN BUILDING ACT.

AT the Woolwich Police Court on Tuesday, May 29th, Mr. J. T. Stevens, builder, of New Eltham, was again summoned by Mr. Thomas Batterbury, District Surveyor for Plumstead and Eltham. On May 1st the defendant was summoned for various irregularities in four houses in Gaitskell-road, New Eltham, and the Magistrate made an order for the District Surveyor's requisitions to be complied with within fourteen days. The irregularities consisted of:—letting the ends of timbers into 9-in. party-walls; carrying up the chimney-shafts to 2 ft. only above the highest points where they cut the roofs; preparing hearths for a thickness of 4 in. only, and of combustible substances; and omitting to fix proper chimney-bars, and to render the outsides of flues.

The present summons was for non-compliance with the order. The District Surveyor having given evidence, the Magistrate made an order for the defendant to pay the costs, and also imposed a penalty of 40s. for each day of non-compliance with the order.

THE EMPLOYERS' LIABILITY BILL.

SIR,—The comment which appeared in your issue of the 2nd inst. (page 390) on the subject of the Government Employers' Liability Bill has been brought to the attention of the Council of this Institute; and they consider the article must have been written under a complete misapprehension of the position which this Institute, in common with the other Master-Builders' Associations, has taken up with reference to the Government Bill. I am directed to inclose a print of the petition which was presented by this Institute against the Bill in question, and to request that you will print it at the foot of this letter in your next issue.

The Council are quite prepared to leave it to your readers to judge as to whether this petition justifies the accusation which you make against the Institute of not showing much "logic or sense of fairness" in the attitude which they have adopted towards the Bill.

I am directed also to point out that your article is seriously inaccurate, and, indeed, misleading, in stating that the limit of compensation fixed by the Bill is "three years' earnings, or, in any case, not more than 150*l*.," since the 8th section of the Bill provides that the compensation shall not exceed, either the "estimated earnings, during three years, of the injured workman, or 150*l*., whichever is larger."

The counsel do not agree with the views which you express on the subject of insurance and its effect upon the employers who cover their risks. It is hardly to be expected that a policy to cover this risk would be continued by the office if repeated accidents occur, which the office has reason to suppose are due to negligence or want of care on the part of the employer, any more than fire insurance companies would continue a risk under similar circumstances.

The Council trust to your sense of fairness to insert this letter in your next issue, giving it the same prominence as the article to which it refers.

RICHARD S. HENSHAW,
Secretary of the Institute of Builders (Incorporated).

31, *Bedford-street, Strand, London, W.C.*,
June 6th, 1888.

*** We cannot possibly find space for the petition referred to, which is a very long one. The Institute of Builders seem to overlook the fact that the charge of "want of logic and fairness" was made equally against both the opposers and supporters of the Bill, and it referred broadly to the general attitude of each side. No doubt the Builders' petition is worded moderately enough; but they are in just the same boat as their opponents; they want to give as little as possible, and the men want to get as much as possible. Their letter does not alter our opinion on the insurance question one whit. As Mr. Broadhurst said, in the debate on the second reading of the Bill, it is not a money question really, but a question of care and responsibility for men's lives. We have had knowledge of incidents on large works within the last two or three years which have impressed us strongly with the idea that this sense of responsibility on the part of contractors and their agents is in some cases not by any means as strong as it ought to be.

THE NORMAN HOUSE, CHRISTCHURCH.

SIR,—I observe that you comment in the last number of the *Builder* [p. 390], on a statement taken from the *Hampshire Independent*, and repeated in some local journals, to the effect that the ruin of the Norman House adjoining the Avon bridge at Christchurch had been made over to the Corporation of the borough, with the consent of Lord Malmesbury and Sir George Meyrick, and that the demolition of this interesting specimen of domestic architecture is contemplated or threatened.

I am happy to inform you that you have been misinformed in every particular.

The house in question and the ground it stands on belong not to Lord Malmesbury or Sir George Meyrick, but to Lady Rose.

The small piece of ground which has been ceded to the Corporation for a public purpose is several yards distant from the house. There has never been any question of demolishing, removing, or injuring the house at all, which is one of the ornaments of the town.

HENRY REEVE.

Foxholes, Christchurch.

*** The Hampshire paper referred to was, of course, entirely responsible for the statement, which seemed to us at the time almost incredible.

The Student's Column.

IRON.

XXIII.—PILLARS.

THE theoretical laws which govern the strength of pillars have not been successfully applied in the calculation of their strength, and therefore the formulæ used for this purpose have been founded more upon experiment than upon theory. The theoretical investigation of the strength of very long pillars (that is to say, pillars that are long in proportion to their other dimensions) holds good, and compares favourably with the results of experiment; but Mr. Hodgkinson found that the same considerations do not apply to pillars whose length is less than fifty diameters when made of cast iron, and of eighty diameters when made of wrought iron.

In fig. 1 the upper half of the pillar is held in position by the combined forces of the downward pressure of the weight acting with a leverage equal to the distance D (fig. 1), the tension in the convex side, and the compression in the concave side of the pillar. Hence, putting M = the moment of resistance of the cross section at the centre of the pillar, we obtain the expression $M = W D$.

FIG 1

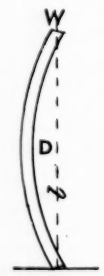
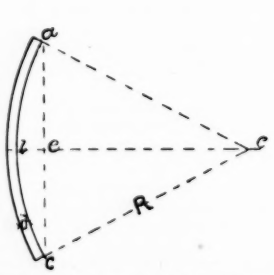


FIG 2



Assuming the deflection curve of the pillar to be a part of a circle, which practically is not far from the truth, and putting d = the least lateral dimension or diameter, also λ = difference in length of the concave and convex sides of the pillar, and l = length shown in fig. 1, we may without sensible error write $D = \frac{\lambda l}{8 d}$; for, assuming fig. 2 to represent the deflected pillar, we obtain $\lambda : l :: d : R$ or $R = \frac{d l}{\lambda}$, and the deflection being very small compared with the radius, we may take the length $e f$ (in fig. 2) as equal to $a f$ (radius), and $a c = a b c = l$. Then by Euclid, Book III., prop. 35, we may write

$$b e \times 2 e f = a e \times e c.$$

Putting $b e = D$ = deflection, the equation becomes

$$D \times 2 R = \frac{l}{2} \times \frac{l}{2}$$

$$\therefore D = \frac{l^2}{8 R} \text{ and by substitution of } R = \frac{d l}{\lambda}$$

we obtain $D = \frac{\lambda l}{8 d}$ as above stated.

Also by substitution, the equations $M = W D$ and $D = \frac{\lambda l}{8 d}$ become $W = \frac{M 8 d}{\lambda l}$ or $8 M \frac{d}{\lambda l}$

The modulus of elasticity of a material is usually represented by the symbol E; and represents, as stated in Article xiv., page 253, the imaginary weight required to stretch or compress a bar of one square inch in section by an amount equal to its length; therefore, calling f the unit stress per square inch of the material employed, the alteration in length may be expressed by the equation $\lambda = \frac{f l}{E}$

But we have already introduced the symbol λ to express the difference in length between the sides of the pillar or the difference in length resulting from both tension and compression; hence $\lambda = \frac{2 f l}{E}$, and thus by substitution, the equation $8M \frac{d}{\lambda l}$ can be converted into

$$8 M \frac{d}{l} \times \frac{E}{2 f l}$$

$$\therefore W = \frac{4 d E M}{f l^2}$$

The longer the pillar compared with its other dimensions, to which this formula is applied, the more correct will be the result. For short or medium pillars other rules must be used to obtain a result which can be corroborated by the result of experiment.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

6,256, Improvements in Latches, &c. W. Kneen.

The latch bolt which is one of the improvements which are the subject of this patent descends by gravity into its shot position, its motion being facilitated by a wheel or runner. The latch is raised by a catch, the tail end of which is attached to or passes through the latch-bolt, so that by moving the said catch the bolt is withdrawn. This catch is pivoted to and underneath the loop handle of the door, so that when the hand is put through the loop the catch can be operated by a movement of the finger.

6,820, Improved Eaves Plate for Roofs and Walls. W. Gwinett.

The eaves plate of a roof constructed according to this invention fits into the flutes by means of a scolloped edge. This edge is made to stand in a vertical position either in front of the wall plate or upon the top, sufficiently high to fill the space between the wall plate and the top of the corrugated sheets used upon roofs. The plate is then bent and carried forward parallel with the top of the wall plate as far as is necessary to cover the corrugations of sheets used for covering walls; it can then be bent into a gutter. The eaves plate may also be pressed or cast in any suitable material.

8,660, Attaching Door Checks. E. and J. M. Verity and B. Banks.

According to this invention, the barrel that contains the spring is made in the usual way. A bracket is fixed to the framing of the door, to one part of which is fixed a guide-rod or stay. To the other side of this bracket is fixed an arm provided with an elongated slot in which the guide-rod and end of piston slide; the opposite end being attached to the door by a hinged bracket. When the door is opened the end of the piston slides in the inclined plane of the elongated slot.

8,849, Improved Door Cramps. S. Bastow.

By the cramp which is the subject of this patent, all the timber of the doors is cramped together at one operation. A frame is made, fitted, and strengthened with angle-iron pieces, and suitable means are employed for operating in one movement the ends of the side and end cramps.

11,937, Fireproof Floors. J. Homan.

The object is to protect the iron used in the construction of buildings from the action of fire. Bricks are formed and placed so that their bottom surfaces project below the underside of the flanges. The lower parts of the bricks on one side of the T-iron bars are dovetailed, and the plaster gets by this a firm hold. The iron bars used in the flooring are preferably T-shape in section, and the bricks are sometimes placed so that they form V-shaped spaces along, into which spaces the concrete or mortar or plaster is pressed, giving both strength and fireproof qualities.

326, Terra-cotta Fireproof Construction. M. H. Blanchard.

According to this invention, slabs or bricks of terra cotta are prepared with holes running through them. These holes, or annular or hollow chambers, allow the hot air or vapour to pass through them,

and this preserves the blocks from distortion. The edges are formed so that the blocks may be joggled or dovetailed together.

3,761, Improved Sash-holder. C. W. Cook.

This invention relates to that class of sash supporters or upholders, whereon rollers are employed to bear against the inner fall of the window-frame. Such appliances are designed for use on windows which have no sash-weights or similar counterbalancing devices. A spring governed by a screw carries two small rollers, against which the sash slides. When screwed home, however, the pressure of the spring prevents the sash sliding up or down.

NEW APPLICATIONS FOR PATENTS.

May 25.—7,658, J. Bush and F. Baker, Door Fastenings.—7,664, H. Fearon, Fireproof Flooring. 7,669, H. Miller, Attaching Sash-lines to Window-sashes.—7,670, J. Harrison, Machine for Sawing Stone.—7,693, C. Kinslow, Drain-trap.

May 26.—7,708, L. Goggs and T. Irvine, Metallic Paints.—7,717, G. & G. Allan, Opening Window-sashes.—7,732, F. Lancaster and E. Nixon, Automatic Emergency Doors for Theatres, &c.—7,751, H. Breuer and Others, Window Sill.

May 28.—7,774, J. Dunn, Fasteners for Casements, Fanlights, &c.—7,781, J. Smith, Manufacture of Cement.—7,792, A. Ford, Sliding Doors.

May 29.—7,810, S. Miller, Fire Grates.—7,811, W. Orr and P. Brown, Glazing.—7,815, J. Champion, Lock Bricks.—7,820, T. Shelley, Glazing Railway Stations, &c.—7,838, C. Huelser, Automatic Flush Bolts for Folding Doors or Windows.—7,845, A. Boult, Saw Mills.

May 30.—7,889, J. Waterhouse, Sanitary Drain Traps.—7,897, E. Homan, Stencilling Apparatus.—7,905, J. Dougall and T. Harries, Artificial Stone.—7,925, H. & H. Holloway, Block Floors or Pavements.—7,940, G. Dölliner, Apparatus for Opening Windows Outside and Inside of the Room.

May 31.—7,957, J. Tonge, Preventing Down-draught in Chimney Flues.—7,962, T. Stead, Metallic Screen or Curtain for Theatres, &c.—7,976, W. Margetts, Portland Cement.

PROVISIONAL SPECIFICATIONS ACCEPTED.

10,861, R. Mitchell, Sewer Ventilation.—5,667, J. Auger, Fanlight and Ventilator Openers.—6,223, J. Whistler, Suspending Velarium, Panoply, or other Canopied Draperies from Ceilings, Roofs, &c.—6,557, W. Cussans, Colouring Portland Cement, &c.—6,744, E. Edwards, Iron Floors.—6,807, P. Stuart, Pavements.—6,813, W. Tennant, Door Checks.—6,826, P. Denniston, Chimney Cowls.—6,843, J. Reddiough, Counterbalancing Window-sashes.—6,882, M. Wallace, Fire-grates.—6,908, E. Andreoni, Closing and Flushing Water-closets.—6,960, W. Scott-Moncrieff, Grease Interceptors for House-drains.—6,965, J. Brindley, Gully Traps.—7,003, G. Otway, Cutting Bricks, Tiles, &c.—7,031, G. Wright, Register Stove Grates.—7,056, M. Hollins, Tiles.—7,082, B. Russell, Building and Glazing Glass Houses.—7,098, J. Whitehouse, Stench Traps for Sewers and Drains.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

8,497, C. Hax, Automatic Sharpening of Saws, &c.—10,562, W. Sargent, Water-waste Preventer for giving a Flush and After-flush.—11,438, J. Cantle, Fireproof Holders for Joists for Party-walls.—2,860, E. Owens and G. Jennings, Stoves and Grates.—3,438, W. Thompson, Heating Buildings, Apartments, &c.—6,211, L. Witthoffft, Circular Saws or Sawing Machinery.—6,472, A. Boult, Door-knobs.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MAY 23.

By WYATT & SON (at Chichester).

Sussex, Westbourne—Enclosures of freehold land, containing 41a. 3r. 24p. £2,120
Prinstead—Freehold house, farm-buildings, and 6a. 2r. 3p. 800
Enclosures of land, containing 8a. 1r. 12p. 534
Chichester—39, North-street, freehold 400

MAY 28.

By ALFRED EVES.

Maida Hill—15, Warwick-road, 53 years, ground-rent £10 680

By MURRELL & SCOBELL.

Islington—2, Thornhill-square, 54 years, ground-rent £7 485

By TOPLIS & HARDING.

Deptford—1, 3, and 5, The Stowage, freehold 240

By EASTMAN BROS.

Forest Hill—82, London-road, freehold 800

By FRANK HARDS.

Lewisham, Lee Bridge—A piece of freehold land ... 650
Greenwich, on the Creek—Collin's Wharf, freehold 2,150

By EDWARD WOOD.

Kilburn—113, 115, and 117, Canterbury-road, 69 years, ground-rent £22. 10s. 1,035
Battersea—2 to 14, Benham-street, 78 years, ground-rent £28 925
Peckham—4 and 5, Hazel-terrace, 74 years, ground-rent £11. 8s. 430
Kennington—2 to 7, Wynyard-terrace, 16 years, ground-rent £48. 18s. 605

By FLEURET & SON.

Gravesend—6 and 7, Arundel-terrace, freehold 680
Barnes—1, Castlenau-gardens West, 41 years, ground-rent £7. 10s. 350

By HENRY & LATCHFORD.

Clapham—6, Caroline-place, 70 years, ground-rent £5 310
Kensington—11 and 12, Providence-terrace, freehold 1,295

MAY 29.

By VAUGHAN & CO.

Islington—215, Liverpool-road, freehold £460

By NORMAN & SON.

Feltham, Middlesex—Enclosure of land, 36a. 1r. 11p., freehold 3,200

By NEWBON & HARDING.

Camden Town—18, Rochester-terrace, 56 years, ground-rent £6 380
New Southgate—5, 6, and 7, Paignton-terrace, 87 years, ground-rent £21 350
Borough, High-street—The Red Cross Tavern, and 1 to 23 odd, Red Cross-place, 50 years, ground-rent £200 3,025
St. George's East—13 to 17, St. George's-street East; 8 to 13, Artichoke-hill; and 90, 91, and 92, Pennington-street, 61 years, ground-rent £150 700
Canonbury—17 to 20, Canonbury-villas, 30 years, ground-rent £32 1,415
60, 62, 66, 68, and 70, Halton-road, 31 years, ground-rent £37. 10s. 1,430

By ALFRED RICHARDS.

Hackney—37 and 39, Great Cambridge-street, freehold 840
Tottenham—1 to 8, Elizabeth-place, 77 years, ground-rent £36 700
1 and 2, Albert-villas, 81 years, ground-rent £15 ... 470

By JONES, LANG, & CO.

Kingsland, Canal-road—The Moulders' Arms, 30 years, ground-rent £5. 12s. 300

By S. WALKER & RUNTZ.

Lower Edmonton—1 and 2, Euston-cottages, freehold 500
Stoke Newington—37 to 47 odd, Wellington-road, 43 years, ground-rent £15 920

By DENNANT & STOPHER.

Stratford—123, Leyton-road, freehold 275
Leyton, Burchell-road—Willow cottage, freehold ... 360
Blackwall—13, Lumsden-street, freehold 120
Bromley-by-Bow—11, St. Leonard's-road, freehold. 430
Wapping—2, Rycroft's-court, freehold 95
Bermondsey—52, Salisbury-street, freehold 165
Deptford, Barnes-alley—Plot of freehold land 65

By R. N. LAND.

Streatham, Monteith-avenue—A set of stabling, 93 years, ground-rent £3. 10s. 350

MAY 31.

By BROAD & WILTSHIRE.

New Cross—83 and 85, New Cross-road, 36 years, ground-rent £11. 12s. 500
Tottenham Court-road — 61, Huntley-street, 19 years, ground-rent £6. 6s. 445
Hoxton — 20, Ivy-street, 35 years, ground-rent £2. 10s. 185
39, Hyde-road, 122 years, ground-rent £3. 6s. 8d.. 445

By DEBENHAM, TEWSON, & CO.

Roehampton—The Elms, with stabling, and 6 acres, freehold 15,500
Southwark—9, Bankside, area 15,726 square feet, freehold 9,000
Regent's Park—73, Avenue-road, 49 years, ground-rent £25 1,800

By WORSFOLD & HAYWARD (at Sandwich).

Kent, New-street—Two enclosures of fruit land, 2a. 3r. 8p., freehold 685
Sandwich, near to—Freehold market-garden land, 8a. 1r. 34p. 710
Staple—Freehold cottage and a plot of land 150

By FAREBROTHER, ELLIS, CLARK, & CO.

Streatham Hill—The freehold residence, Rossendale Lodge 1,920
Brandon House, adjoining, freehold 1,950
Claremont Lodge and Claremont Villa, freehold... 2,050
Brixton Hill—The freehold residence, Ellerslie 1,670
Brighton—61, Lansdowne-place, freehold 1,200
Regent's Park—47, Baker-street, 13 years ground-rent £12. 12s. 370

By NEWBON & HARDING.

Finsbury Park—10, Blackstock-road, freehold 1,320
25, 27, and 71, Stroud Green-road, and stabling, freehold 5,590
73 to 81 odd, Stroud Green-road, freehold 9,325
Hornsey Rise—4, Shaftesbury-road, freehold 320
46 to 52 even, Stroud Green-road, 79 years, ground-rent £25. 4s. 2,755
77, Lennox-road, 76 years, ground-rent £25..... 150
83 and 85, Fonthill-road, 76 years, ground rent £12 700
Holloway—34, Ennis-road, 79 years, ground-rent £6. 10s. 260
Caledonian-road—165, Copenhagen-street, 45 years, ground-rent £5. 10s. 430
1 and 2, Balmoral-grove, 74 years, ground-rent £12 410

By FULLER & FULLER.

Hyde Park—10, Sussex-gardens, 61 years, ground-rent £25 2,800
Forest Hill—69, St. Germain's-road, 78 years, ground-rent £7 250
Hackney—69, Mansford-street, freehold 400
Wandsworth-road—Lease and goodwill of the Shakspeare beerhouse, 16 years 550
Lambeth—97 and 98, Prince's-road, and 23A, George-street, freehold 350
24 and 25, George-street, freehold 215
100, Prince's-road, freehold 220
21A, 22, and 23, George-street, freehold 550
Essex, near Dunmow—Greenfields and other farms, containing 103a. 3r. 33p., freehold 1,220

By E. STIMSON.

Twickenham — 2, 12, and 17, Garfield-road, 76 years, ground-rent £15 175
Brixton—1 to 5, Russell-cottages, and 1 to 17, Russell-gardens, 11 years, ground-rent £170..... 120
30, 32, and 34, Cowley-road, and a ground-rent of £10, 13 years, ground-rent £25 270
Walworth—30, Carter-street, freehold 600
47, Hill-street, 3 years, ground-rent £2. 9s. 3d. ... 32
Battersea—22 and 23, Church-lane, and two plots of land, freehold 270
183, 185, and 187, Battersea Park-road, 75 years, ground-rent £24 2,380

By PHILLIPS, SON, & NEALE.

Lambeth—13, Hercules-buildings, 23 years, ground-rent £6. 5s. 240

By E. & S. SMITH.

Burton-crescent—Improved ground-rents of £147 per annum, 18 years 1,235

By EYDMANN & SON.

Acton—29 and 31, Enfield-road, freehold £400
42, 44, 46, Park-road East, freehold 1,000
Hampstead—13 and 14, Holly Mount, copyhold..... 155

By Messrs. CHADWICK.

Lamb's Conduit-street—Lease of Nos. 47 and 49, term 23 years 100

By C. D. FIELD & SON.

Southwark—70, 72, and 74, Red Cross-street, freehold 1,100
17 to 23 odd, Harrow-street, and stabling, freehold 1,020
The letting of eight plots of land in Marshalsea-road, term 80 years, realised £252 per annum.

By H. DRAKE.

Maida-vale — 51, Kilburn Park-road, 59 years, ground-rent £2. 10s. 790

JUNE 1.

By H. C. WOOD.

Haggerston — One-twelfth share of ground-rents yielding £947. 17s. a year, reversion in 31 years; also one twenty-fourth share of above, subject to the life of a lady (without children, and now aged 50 years) 3,210

By T. STEVENS.

Lisson-grove—32, Little North-street, 34 years, ground-rent £10 75

By L. FARMER.

Brondesbury—27 and 29, Exeter-road, 81 years, ground-rent £20 1,450

By PROTHEROE & MORRIS.

Mile End—3 to 9 odd, Huddart-street, 86 years, ground-rent £20 1,250

By C. W. MILLAR.

St. John's Wood—27, Abercorn-place, freehold 1,625
Byfleet, Surrey—The Lodge, and 25a. 2r. 32p., freehold 12,000

By DENT & DALLAS.

Islington, Vincent-terrace—Ground-rent of £42, reversion in 38 years 1,450
Gordon-street—Ground-rent of £36, reversion in 38 years 1,090
Graham-street—The reversion to the Prince of Wales public-house, term 38 years 505
Sudeley-street—Ground-rent of £113. 6s., reversion in 38 years 3,610

By F. J. BISLEY.

Bermondsey—25 and 27, Ambrose-street, 49 years, ground-rent £12 415
Old Kent-road—15 and 17, Sharratt-street, 74 years, ground-rent £8 325
Hammersmith—3 to 11 odd, Holcombe-street, 75 years, ground-rent £31. 10s. 650
Rotherhithe—72, 73, and 74, Adam-street, 71 years, ground-rent £12 565

MEETINGS.

SATURDAY, JUNE 9.

Association of Municipal and Sanitary Engineers and Surveyors.—Yorkshire District Meeting at York. 11 a.m., Visits to various works. 3 p.m., Meeting in the Council Chamber. Paper by Mr. E. G. Mawbey, City Surveyor, on "Municipal Work in York."

St. Paul's Ecclesiological Society.—Visit to Harmondsworth Church and Tithe-Barn, under the guidance of Mr. A. D. White. Train to West Drayton from Paddington at 4 p.m.

MONDAY, JUNE 11.

Royal Institute of British Architects.—Mr. C. Purdon Clarke, C.I.E., on "Examples of Moghul Architecture in the Indian Section of the South Kensington Museum." 8 p.m.

Liverpool Architectural Society.—Annual Meeting, and Closing Address by the President, Mr. E. Kirby, A.R.I.B.A. 7 p.m.

THURSDAY, JUNE 14.

Society of Antiquaries.—8·30 p.m.

SATURDAY, JUNE 16.

Architectural Association.—Visit to Bramshill, Hampshire. (See advt. on first page of this week's *Builder*.)

Miscellanea.

An Evening Promenade and Floral Fete, in aid of the Gardeners' Orphan Fund, was held on Wednesday evening in the Flower Market, Covent Garden, kindly lent for the occasion by the Duke of Bedford. The special object of the *fête* was to render pecuniary aid to the Gardeners' Orphan Fund, which was inaugurated in 1887 to commemorate the Jubilee of Majesty's reign. From the Fund monetary grants are made to assist in rearing, educating, and clothing orphan children of gardeners. The Wholesale Flower Market, although almost unknown to the public,—being open only late at night and in the very early hours of morning,—is one of the floral sights of the world, and when completely stocked with flowers for sale, as it was on Wednesday night, it presents to view a *coup-d'œil* of exceeding gaiety and brilliancy.

Sale of Engineering Plant.—We notice that on Tuesday next and following days, Messrs. Fuller, Horsey, Sons, & Cassell will offer for sale by auction in lots, on the premises, the whole of the valuable plant, machinery, tools, utensils, new stock-in-trade, and stores belonging to the Reading Ironworks, Berks, one of the oldest-established and principal engineering works in the country. The sale, it is said, will include an extensive collection of tools by the best makers. The freehold and leasehold premises will be offered at the same time.

Cemetery Extension at West Hartlepool.—On the 31st of May Mr. Stephen Harding Terry, A.-M.Inst., C.E., an Inspector of the Local Government Board, sat at the Municipal Offices, West Hartlepool, for the purpose of taking evidence in reference to the application of the Corporation for sanction to borrow 7,000*l.* for the purpose of enlarging the existing cemetery in Hart-road. It is proposed to add eighteen acres to the present ground, which is some seventeen acres in extent, and was consecrated in 1856. The number of interments up to the end of last year was 14,692, and the new ground, it is estimated, will provide for 14,000 adult burials, all that will be required, it is calculated, for the next twenty-five years. The total cost of the proposed extension, which must be completed within the next three years, is estimated by the Borough Surveyor, Mr. J. W. Brown, C.E., at about 10,000*l.*, including drainage and building, the land alone having cost about 5,000*l.* The Town Clerk (Mr. Higson Simpson) and Mr. J. W. Brown, C.E. (Borough Surveyor), were both examined.—A question arose as to whether the extended cemetery would cause contamination of the water supply from the water works, which are in close proximity to the cemetery. Mr. Trewhitt, secretary of the Gas and Water Company, stated that the wells from which the main supply was derived varied in depth from 100 to 160 feet. The Surveyor described the system of drainage, which, he considered, would prevent contamination. Mr. R. Looney offered an objection on the ground of risk of damage to the main water supply, and on account of the cemetery being too far from the southern end of the town; and Councillor Suggitt said the land was too low, and was frequently flooded. Other objections were raised by Capt. Edgar and Mr. John Tate, the latter declaring that the graves would always be full of water. The Inspector afterwards visited the *locus in quo* in company with Alderman Murray and the borough officials. The *North Eastern Daily Gazette*, in commenting on the inquiry, says that Mr. Terry expresses his belief that there is no fear of contamination of the water supply.

The Gordon Statue at Aberdeen.—The statue of the late General Gordon, R.E., C.B., designed by the late Mr. T. Stuart Burnett, A.R.S.A., Edinburgh, has now been placed in the position it is to occupy in the new square in front of the Art Gallery and Museum and the Gray School of Art, Schoolhill, Aberdeen. These two buildings are connected by an archway under which is the entrance to Gordon's College. The site is practically in the centre of the city, and the statue's position is about 26 ft. in front of this archway, and about 6 ft. back from the footway in Schoolhill, which has lately been greatly improved and converted into an important thoroughfare, in continuation of which the new Rosemount Viaduct will run in a quadrantal shape to South Mount-street. The pedestal of the statue is about 9 ft. in height, and formed of very finely axe-dressed Corennie granite, which is of a pinkish colour. The chamfered basement is 6 ft. square, above which is a plinth 5 ft. square; then a moulded base, surmounted by the pedestal proper, which is 3 ft. 9 in. square. The statue itself is 9 ft. 6 in. in height, and is not fastened to the pedestal by dowels, but rests upon a plinth, which was cast, along with the statue, in bronze, in the foundry of Sir John Steill, Grove-street, Edinburgh, under the charge of Mr. Adam Walker. The basement is surrounded by a pavement 3 ft. broad, also of axe-dressed Corennie granite, with four small pall stones, one in each corner. The hero of Khartoum is represented in a standing position, bare-headed, in the undress uniform of a British general. The granite pedestal, which weighs 16 tons, was executed by Mr. George Leslie Jamieson, of the Crown Granite Works, Aberdeen. The statue itself was subscribed for by the Clan Gordon, the movement having originated with the Marquis of Huntly, the Earl of Aberdeen, and the Duke of Richmond and Gordon; and the statue will be unveiled by the Marquis of Huntly on Saturday, June 16th. The funds raised by the Gordon Clan having been insufficient, the pedestal was erected from subscriptions collected by Mr. James Matthews, architect, lately Lord Provost of Aberdeen, the Town Council of the city contributing 25*l.* An inscription will be cut in front of the pedestal of the Gordon statue, but the exact terms have not yet been settled. Mr. P. H. Chalmers, advocate, has acted as secretary to the subscribers.

Memorial of the late Earl of Dudley in Worcester Cathedral.—The Worcestershire county memorial of the Earl of Dudley, which has been erected in the Lady-chapel of Worcester Cathedral, was on Saturday afternoon last formally handed over to the Dean and Chapter. The memorial to the late Lord Lyttelton, which was formerly in the north transept of the Cathedral, has recently been removed and placed between the central pillars on the north side of the Lady-chapel, and the Dudley memorial occupies the corresponding position on the south side of the chapel. The Dudley memorial was designed and executed by Mr. James Forsyth, sculptor, of London, who also executed the Lyttelton memorial. On the suggestion of Canon Melville, the hon. sec. to the committee, it was decided that the cenotaph should be an open one. The recumbent effigy which surmounts the monument represents the late earl draped in a peer's robes. It is executed in white statuary marble, and the likeness is said to be a faithful one. The style of the design is Gothic, of the Early English period, to harmonise with the architecture of the Lady-chapel. At the four corners of the monument are figures emblematic of Music, Architecture, Sculpture, and Painting. The decorative part of the memorial is of alabaster, and the plinth of red granite. The upper part of the open cenotaph is supported by clusters of marble columns (thirty-six in number) of Welsh green rising from a platform in the centre of which is a white marble cross resting on bronze-coloured marble, and surrounded by an enrichment of marble inlays. The label mouldings of the arches are terminated by angels in a devotional attitude. Beneath the moulding along the upper part of the monument runs a brass band with a Latin inscription, of which the following is a translation:—"In memory of William, Earl of Dudley, by whose munificence chiefly,—for the greater Glory of God and the everlasting Salvation of men,—this cathedral was restored. Born 27th March, 1817: died 4th May, 1885."

Statue to the late Sir Bartle Frere.—On Tuesday last H.R.H. the Prince of Wales unveiled the statue erected to the late Sir Bartle Frere, in the gardens of the Victoria Embankment, nearly opposite to the National Liberal Club. The statue represents Sir Bartle Frere in the uniform of a Civil servant, with the open flowing robe of the Order of the Star of India, and wearing the collar of that order, and the insignia of the Bath. The statue is 11 ft. in height, and was cast in bronze by Messrs. Moore & Co., of Thames Ditton. The plinth upon which it stands is light grey granite, quarried by Messrs. John Freeman & Sons, of Penryn, Cornwall. Below the statue is a seated allegorical figure, grasping with the left hand a sword, which has its point downwards, and in the right holding an olive branch over a shield, on which is inscribed "Pro Patria," and at its foot is a laurel wreath—the whole typical of victory achieved, the peace sought, and the readiness to maintain honour with the sword. "Bartle Frere" are the words below, and on the eastern and western sides "Africa" and "India." The sculptor is Mr. Brock.

Artillery Hall, Edinburgh.—At the Edinburgh Dean of Guild Court last week, Colonel Kinnear, of the M.C.A.V., obtained warrant to make alterations in the Artillery Hall at Grindlay-street. These alterations are on an extensive scale. It is intended to add a story to the present hall, and to form an upper hall. The lower hall will then be used for big-gun drill, and the upper hall for ordinary company drill. The entrance from Grindlay-street will be widened, and the rooms on the ground-floor of the building in Grindlay-street, which are at present used by the Brigade, will be turned into battery-rooms, &c. The flat above will also be taken in under the new arrangements, and turned into orderly and sergeants' rooms, and a dwelling for the sergeant-major. Behind the drill-hall, what is now a bleaching-green will be built over with a three-story erection, the first and second floors of which will be used principally as battery-rooms; and the third floor, which will be nearly at the level of the upper hall, and will be entered from it, will be fitted up as retiring-rooms. The alterations are from plans by Messrs. Kinnear and Peddie, the former of whom is colonel of the Brigade.—*Scotsman.*

The Ironmongers' Company.—At the Easter meeting of the Worshipful Company of Ironmongers, held at Ironmongers' Hall, Fenchurch-street, a few days since. Mr. T. C. Noble (of Dalston) was unanimously chosen Warden of the Yeomanry for the year ensuing. After the closing of the Court, the Yeomanry were entertained in the hall of the company, the Senior Warden, Mr. Henry Maudslay, M. Inst. C.E., presiding. In responding to the toast, "The Worshipful Company of Ironmongers, root and branch, and may it flourish for ever," and "the Yeomany," the new Warden (Mr. Noble) referred to many matters of interest which were now interesting the citizens, and said he was glad to hear that the Court and Livery of their ancient guild, which dated their incorporation as far back as 1464, had, by careful management, and with more than the usual zeal of trustees, been able to accumulate the funds set apart under a well-known charity, and intended either to establish a technical school of education or a foundation which would equal, if not rival, those of the Drapers' and other City Companies.

New Public Baths at Hampstead.—On Tuesday afternoon the Hampstead Public Baths, erected under the provisions of the Baths and Washhouses Acts, were opened in the Finchley New-road, Hampstead, in the presence of a large number of residents of the borough of Hampstead. The building is of red brick with dressings of Mansfield stone externally, and the accommodation provided embraces two swimming baths for men, each 100 ft. long by 35 ft. wide, a swimming bath for ladies, 56 ft. long by 25 ft. wide, and a number of first and second class private baths for both sexes. The first-class men's swimming-bath is provided with a capacious gallery, and it is intended to use this bath during the winter months as a hall for meetings, concerts, &c. The architects are Messrs. Spalding & Auld, whose designs were selected in competition by the Commissioners, and the builders are Messrs. John Allen & Sons, of Kilburn, the clerk of the works being Mr. G. Buck.

The Registration of Plumbers.—On Saturday last, at the City and Guilds Institute, Finsbury, an examination was held under the auspices of the Worshipful Company of Plumbers for granting Certificates of Registration to competent workmen. The practical examination included various branches of lead-work, and the theoretical questions related to the several subjects of plumbers' materials, house-fittings, and sanitation. The examiners were Mr. Hudson, Assistant-Chairman of the Registration Committee, and Messrs. Smeaton, Davis, and Lobb. Plumbers attended from Ashton-under-Lyne, Bath, Blandford, Bristol, Gloucester, Margate, Shifnal, Southampton, and various districts of London. Twenty-five per cent. of those attending passed the full examination.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. .....ton	6	10	0	7	10	0
Teak, E.I.....load	8	0	0	12	10	0
Sequoia, U.S.....foot cube	0	2	3	0	3	0
Birch, Canada .....load	2	15	0	4	15	0
Fir, Dantsic, &c.	2	0	0	4	0	0
Oak ,, ...	2	0	0	4	10	0
Canada	4	0	0	6	10	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	2	10	0	4	0	0
Lath, Dantsic.....fathom	3	10	0	5	0	0
St. Petersburg.....	5	0	0	6	0	0
Wainscot, Odessa, crown.....	2	10	0	3	0	0
Deals, Finland, 2nd and 1st...std.100	8	0	0	9	10	0
,, 4th and 3rd.....	6	10	0	7	10	0
Riga	6	0	0	7	10	0
St. Petersburg, 1st yellow	9	10	0	14	10	0
,, 2nd ,, ...	8	0	0	9	0	0
,, white	7	0	0	10	0	0
Swedish.....	7	0	0	15	10	0
White Sea	8	0	0	17	0	0
Canada, Pine, 1st	14	0	0	23	0	0
,, ,, 2nd	9	0	0	15	0	0
,, ,, 3rd, &c.	7	6	0	9	10	0
,, Spruce, 1st	8	0	0	9	10	0
,, 3rd and 2nd	6	0	0	7	10	0
New Brunswick, &c.	6	0	0	7	5	0
Battens, all kinds	4	10	0	11	0	0
Flooring Boards, sq., 1 in., prepared, First	0	10	0	0	12	0
Second	0	7	0	0	9	6
Other qualities	0	4	6	0	6	6
Cedar, Cuba.....foot	0	0	3½	0	0	4
Honduras, &c.....	0	0	3½	0	0	3½
Australian	0	0	2½	0	0	3½
Mahogany, Cuba	0	0	4½	0	0	6
St. Domingo, cargo average	0	0	4½	0	0	6
Mexican ,, ...	0	0	4	0	0	4½
Tobasco ,, ...	0	0	4½	0	0	5½
Honduras ,, ...	0	0	4½	0	0	5½
Rose, Rio .....ton	8	0	0	11	0	0
Box, Turkey	5	0	0	12	0	0
Walnut, Italian .....foot	0	0	4	0	0	5½

METALS.	£.	s.	d.	£.	s.	d.
IRON—Bar, Welsh, in London...ton	4	17	6	5	0	0
,, ,, at works in Wales ...	4	7	6	4	10	0
,, Staffordshire, London.....	5	5	0	7	0	0
COPPER—						
British, cake and ingot..... ton	78	0	0	81	0	0
Best selected	79	0	0	82	0	0
Sheets, strong	88	0	0	0	0	0
Chili, bars	81	0	0	81	10	0
YELLOW METAL.....lb.	0	0	7½	0	0	7½
LEAD—						
Pig, Spanish .....ton	12	2	6	0	0	0
English, common brands	12	10	0	0	0	0
Sheet, English.....	13	7	6	13	10	0
SPELTER—						
Silesian, special .....ton	16	10	0	0	0	0
Ordinary brands.....	16	0	0	16	5	0
TIN—						
Straits .....ton	83	0	0	0	0	0
Australian	83	0	0	0	0	0
English Ingots.....	93	0	0	0	0	0

METALS (*continued*).	£.	s.	d.	£.	s.	d.
ZINC—						
English sheet.....ton	21	0	0	21	10	0
OILS.						
Linseed .....ton	18	7	6	0	0	0
Cocoanut, Cochin	26	0	0	26	10	0
Ceylon	23	0	0	23	10	0
Palm, Lagos	20	0	0	20	10	0
Rapeseed, English pale	24	10	0	0	0	0
,, brown	23	0	0	0	0	0
Cottonseed, refined	20	15	0	21	0	0
Tallow and Oleine	25	0	0	45	0	0
Lubricating, U.S.	5	15	0	6	0	0
,, refined	7	0	0	12	0	0
TURPENTINE...						
American, in casks.....cwt.	1	9	0	0	0	0
TAR—						
Stockholm .....barrel	0	15	9	0	0	0
Archangel	0	9	6	0	0	0

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Road Materials	Lewisham Board of Wks	*Official*	June 12th	ii.
Steam Fire-Engine, Hose-Cart, &c.	Borough of West Ham...	Lewis Angell	do.	ii.
W.C., Projections, &c.	Whitechapel Union.....	Bruce J. Capell	do.	ii.
Engine and Boiler Houses, &c.	St. Helen's Corporation	D. M. F. Gaskin	do.	ii.
New Station Buildings, Aylesbury	L. & N. W. Ry. Co.....	*Official*	June 13th	ii.
Broken Granite, Flints, and Ballast	Barking Local Board ...	C. J. Dawson	June 14th	ii.
Norwegian Granite Kerb and Channel Stone...	Folkestone Cor.	A. W. Conquest	June 15th	x.
Engineering Works, Stockwell	Met. Asylums Board ...	Keith D. Young	do.	x.
Road-making Works	Hornsey Local Board ...	T. De Courcy Meade ...	June 18th	x.
Sewering & Making-up Roads, Tar-paving, &c.	Hendon Local Board ...	S. S. Grimley	do.	x.
Formation of Footpath, &c., Hackney.....	Met. Board of Works...	*Official*	June 19th	x.
Kerbstone	Reigate Council	do.	do.	ii.
Granite	do.	do.	do.	ii.
Drinking Fountain	Bromley Local Board...	W. A. Williams.....	do.	x.
Erection of Five Houses, Croydon.....	.....	A. Broad.....	June 20th	ii.
Cast-Iron Water-Pipes	Nelson Local Board.....	Newton & Son.....	June 21st	x.
Rebuilding Works, Caterham Asylum.....	Met. Asylums Board ...	*Official*.....	June 22nd	x.
Laying Cast-Iron Water-Pipes	Mountain Ash Local Bd.	J. Mansergh	June 25th	x.
Water-Meters, &c.	Com. of Rathmines and Rathgar.....	*Official*.....	do.	ii.
Hydrants, &c.	do.	do.	do.	ii.
Asphaltic Tar-Paving	Tottenham Local Board	John E. Worth.....	June 26th	x.
Portland Cement	Brighton Town Council	P. C. Lockwood.....	June 27th	x.
Drain Pipes	do.	do.	do.	x.
Granite Curb and Pitchers	do.	do.	do.	x.
Making-up Road	Barnet Local Board.....	— Mansbridge	July 2nd	x.
Cleaning, Painting, Repairs, &c.	School Brd. for London	*Official*	Not stated...	x.
Enlargement of Board Schools, &c.	do.	do.	do.	x.
Painting Works, York	War Department.....	do.	do.	ii.
Extension of Building, &c.	Lincoln Equit. Co-op. S.	F. Smith.....	do.	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor and Inspector of Nuisances	Ely Local Bd. of Health	120*l.*	June 14th	xvi.
Inspector of Nuisances	St. Marylebone Vestry	2*l.* 2s. per week	June 15th	xvi.
Engineer's Assistant	Rawtenstall Local Board	Not stated.....	June 16th	xvi.
Road Surveyor.....	Leyton Local Board.....	3*l.* per week.....	June 21st	xvi.
Engineer	Cor. of Nottingham.....	300*l.*	June 20th	xvi.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

ACTON.—For the erection of shops in High-street, Acton, W., for Mr. J. C. Taylor. Mr. Edward Monson, jun., A.R.I.B.A, architect, Grosvenor House, The Vale, Acton, W. :—

Ashfold & Co., West Kensington, W.	£4,450 0 0
Scharien & Co., South Kensington, S.W.	4,343 0 0
G. Hooper, Acton, W.	4,342 8 0
Jones & Co., Gloucester	4,139 0 0
F. L. Linzell, Bedford-row, W.C. ...	4,120 0 0
Dover, Wood, & Co., Goswell-road, E.C.	4,119 13 6
Wilkins & Son, Eynsham, Oxon * ...	4,045 0 0
T. Martin, Maidenhead	3,850 0 0
W. J. Beale, Battersea	3,845 0 0
A. Brickell, West Kensington, W....	3,474 0 0
J. Edmunds, Poplar, E.	3,470 0 0
G. Lyford, Shepherd's Bush, W.....	3,455 0 0

* Too late.

BROMLEY.—For additions and alterations to Congregational Schools, Widmore-road, Bromley. Mr. A. Hennings, architect :—

Holloway	£1,342 0 0
Grabb	1,120 0 0
Bowyer	1,112 0 0
Smith & Sons (accepted)	1,010 0 0

CHEAM (Surrey).—For the erection of a brewery and retorrefying kiln at Cheam, Surrey, for Mr. Spencer C. Wilde. Messrs. Inskipp & Mackenzie, architects, 5, Bedford-row, London, W.C. Quantities by Messrs. R. L. Curtis & Sons :—

	Brewery.	Kiln.
Thos. Sloman, Camberwell.....	£2,552 12 6 ...	£254 18 6
Geo. Hards, Ewell.....	1,765 0 0 ...	225 0 0
Jacob Arney, Sutton	1,400 0 0 ...	183 0 0
J. Potter, Sutton	1,240 0 0 ...	150 0 0
H. Adams, Sutton (accepted)..	1,125 0 0 ...	156 0 0

CHILWORTH (Surrey).—For alterations and additions to house at Chilworth, near Guildford. Mr. F. A. Walters, architect :—

Buckland & Wheeler	£592 0 0
Etherington	585 0 0
J. Smith & Sons	577 0 0
Goddard	513 0 0

CROYDON.—For new branch premises for the London and County Banking Co., at Croydon. Mr. W. Campbell Jones, architect :—

Page	£9,250 0 0
Bowyer	8,775 0 0
Higgs & Hill	8,394 0 0
Perry	8,383 0 0
Dabbs	8,381 0 0
Avis	8,320 0 0
Taylor	8,289 0 0
Morter.....	8,247 0 0
Parsons	8,209 0 0
Greenwood.....	8,199 0 0
Sheppard.....	7,990 0 0
Chappell	7,848 0 0
J. Smith & Sons (accepted)	7,822 0 0

DARTFORD.—For the erection of hospital for convalescing small-pox patients at Gore Farm, near Dartford, Kent, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities supplied :—

Barrett & Power.....	£59,100 0 0
Bunning & Son.....	57,600 0 0
Brass & Son	57,555 0 0
W. Shurmur.....	52,830 0 0
W. Knight	50,250 0 0
H. Lovatt	48,400 0 0
Shillitoe & Son	47,000 0 0
W. Johnson, Belle Vue-road, Wandsworth-common (accepted).....	47,000 0 0

DARTFORD.—For painting and other work to the Camp buildings in connexion with the above hospital. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities not supplied :—

W. F. Hadlow	£793 7 0
W. H. Lesser.....	659 0 0
W. Johnson	580 0 0
Vigor & Co., King-street, Poplar *.....	435 0 0

* Accepted.

FOREST HILL, S.E.—For converting ice-wells into stables, &c., for Mr. William Ashby. Mr. T. Arthur Lewis, architect. Quantities supplied :—

T. Roberts	£634 0 0
Wightwick & George	619 3 0
J. Smith & Sons	583 0 0
Wm. Marriage	540 0 0
J. Waddington.....	493 5 0
J. & C. Bowyer (accepted)	489 16 0
J. Allen & Sons (too late).....	488 0 0

GATESHEAD-ON-TYNE.—For three cottages, Sheriff-hill, Gateshead-on-Tyne, for Mr. R. Snowden. Mr. Chas. Kempson, C.E., architect :—

E. & T. George, Newcastle	£750 0 0
Milburne & Gibson, Blackhill	560 0 0
F. Wakefield, Gateshead	480 10 0
Moorhead & Arkle, New Benwell	475 7 0
Thos. Hunter, Washington	464 6 7
Harrison & Lowes, Gateshead	460 0 0
J. Ross, Gateshead	453 11 5
Greason Bros., Gateshead.....	386 9 2
T. D. Kay, Windynook.....	379 16 0

HORNSEY.—For alterations and additions at the Stapleton Hall Tavern, Crouch-hill, Hornsey, N., for Mr. F. W. Chamberlain. Mr. H. I. Newton, architect, 17, Queen Anne's Gate, Westminster, S.W. :—

H. & E. Lea	£1,638 0 0
S. Godden	1,625 0 0
J. Anley	1,456 0 0
S. R. Lamble.....	1,444 0 0
S. Goodall	1,441 0 0
H. Burman & Sons, Kennington Park*	1,427 0 0

* Accepted.

LEEDS.—For building the first portion of Queen's Arcade, for Messrs. Armistead & Procter. Mr. Edward Clark, architect, 432, Strand, London, W.C. :—

J. A. Wright, Leeds	£18,112 0 0
Patman & Fotheringham, London...	13,393 0 0
J. O. Richardson, London	13,320 0 0
Shillitoe & Son, Bury St. Edmunds	13,140 0 0
Kirk & Randall, Woolwich	12,913 0 0
W. J. Adcock, Dover	12,870 0 0
J. & W. Beanland, Bradford	12,397 0 0
R. Brelsford, Leeds	11,750 0 0
Longley Bros., Leeds.....	11,398 0 0
W. Ives & Co., Shipley.....	11,259 0 0

LEYTON (Essex).—For the erection of a block of school buildings, to be known as the Mayville-road Schools, Leyton, Essex, for the Leyton School Board. Mr. J. T. Newman, architect, 2, Fen-court, Fenchurch-street, E.C. Quantities by Messrs. R. L. Curtis & Sons :—

	Structure.	Foundations.	Total.
Kirk, Knight, & Co..	£16,500 ...	£2,312 ...	£18,812
Everett & Son.....	13,450 ...	3,185 ...	16,635
Staines & Son	14,344 ...	1,644 ...	15,988
Coxhead	13,234 ...	1,909 ...	15,143
Shurmur	13,608 ...	1,125 ...	14,733
Stimpson	12,700 ...	1,260 ...	13,960
Hoskings	12,300 ...	1,399 ...	13,699
Holland.....	12,222 ...	1,414 ...	13,636
Catley	12,110 ...	1,490 ...	13,600
Shillitoe	11,995 ...	1,475 ...	13,470
Longley.....	11,760 ...	1,638 ...	13,398
Lawrance & Sons ...	12,184 ...	1,179 ...	13,363
Morter	11,907 ...	1,240 ...	13,147
Gregar	11,930 ...	984 ...	12,914
Barrett & Power.....	11,480 ...	1,160 ...	12,640
Hearle & Son *	11,590 ...	1,025 ...	12,615

* Accepted.

LEYTON (Essex).—For the erection of a dwelling-house, shop, and photographic studio, Leyton-road, for Mr. W. Edward Wright. Mr. Charles E. Jackson, architect, 185, Grove-road, E. :—

Jackson & Todd, 192, Hackney-road..	£1,129 0 0
Boulter & Lee, Forest Gate	958 0 0
C. Everard, Stratford	939 0 0
J. Chessum, Finsbury.....	915 0 0
G. W. Beale, Cambridge Heath	898 0 0
Coulsell Bros., Bonwell-street, Bethnal Green (accepted)	893 0 0

LEYTONSTONE (Essex).—For certain alterations and the erection of a one-story building, 40 ft. by 35 ft., at Harvey-road, for Mr. A. Watson. Mr. W. C. Livermore, architect and surveyor :—

A. Nicholls, Harrow-road	£327 0 0

LONDON.—For restoring roof after recent fire at the National Club, Whitehall-gardens :—

Wm. Groom, Dulwich (accepted)	£113 0 0

[No competition.]

LONDON.—For alterations and additions at the Wiltshire Brewery, Hackney-road, for Messrs. Chandler & Co. Mr. F. W. Stent, architect :—

J. W. Sawyer, 97, Clapham Park-road, S.W.*	£482 5 0

* Accepted without competition.

LONDON.—For alterations and additions to the Midshipman public-house, Clerkenwell. Mr. W. C. Jones, architect :—

Bedall & Co.	£4,290 0 0
Herman & Co.	3,997 0 0
Colls & Sons	3,922 0 0
Patman & Fotheringham	3,763 0 0
J. Smith & Sons.....	3,747 0 0
Kirk & Randall	3,640 0 0

LONDON.—For painting and decorating the Lord Liverpool public-house, Clark-street, Stepney, E., for Mr. F. Garner. Mr. J. G. Needham, architect :—

J. A. Taylor, Dalston.....	£139 0 0 !
W. Finch, Stepney	85 0 0
S. W. Hawkings, Mile End	83 0 0
J. Walker, Limehouse	79 0 0
J. & F. Bane, Leytonstone (accepted).	73 10 0 !

LONDON.—For alterations and repairs to the Prince Alfred public-house, Offord-road, Barnsbury, N., for Mr. W. Andrews. Mr. J. G. Needham, architect :—

J. A. Taylor, Dalston.....	£585 0 0
S. W. Hawkings, Mile End	449 0 0
J. Walker, Limehouse (accepted)	396 0 0

LONDON.—For painting, &c., externally the Anchor Brewery, Mile End, E., for Messrs. Charrington & Co. Messrs. Stock, Page, & Stock, architects, 9, Denman-street, London Bridge, S.E. :—

Godden	£2,014 0 0 !
Greenwood.....	1,250 0 0
Rider	1,238 0 0
Heeps	1,058 0 0
Cocks	949 0 0
Pritchard (accepted)	940 0 0 !

LONDON. — For rebuilding the Old White Horse Tavern, Whitcomb-street, Leicester-square. Mr. W. T. Farthing, architect, 46, Strand :—

W. S. Joselyne & Co.	£5,715	0	0
Patman & Fotheringham	5,473	0	0
S. R. Lamble	5,367	0	0
Spencer & Co.	5,350	0	0
Leslie & Knight	5,280	0	0
Scrivener & Co.	5,278	0	0
T. L. Green	5,235	0	0
Kirk & Randall	5,082	0	0
Gould & Brand	4,987	0	0
J. Allen & Sons	4,669	0	0
Jackson & Todd	4,650	0	0
Green & Lee (accepted)	4,636	0	0

LONDON. — For alterations at the Green Dragon, Fleet-street. Mr. W. T. Farthing, architect, 46, Strand :—

Scrivener & Co.	£1,158	0	0
S. R. Lamble	963	0	0
Spencer & Co.	960	0	0
Jackson & Todd	944	0	0
Leslie & Knight	873	0	0

LONDON. — For painting, &c., at the Licensed Victuallers' Schools, Kennington-lane, for the Governor and Committee. Mr. W. T. Farthing, surveyor, 46, Strand :—

J. Marsland	£325	0	0 !
W. Wythe	276	0	0
Spencer & Co.	270	0	0
Pickersgill & Smith	265	0	0
H. Crabtree	193	0	0 !

LONDON.—For works to stabling and covered yard, for the London Omnibus Carriage Company (Limited), York-road, King's Cross. Mr. W. T. Farthing, architect, 46, Strand :—

Pickersgill & Smith (accepted)	£860	0	0

LONDON.—For alterations at the Roebuck public-house, King's-road, Chelsea. Mr. W. T. Farthing, architect :—

Scrivener & Co.	£667	0	0
S. R. Lamble	589	0	0
Leslie & Knight	587	0	0
Jackson & Todd	579	0	0
Spencer & Co.	532	0	0

LONDON.—For general repairs, decorations, and sanitary works, at 41, Piccadilly, for Mr. P. B. Fores. Mr. D. Cubitt Nichols, architect :—

Shires	£405	0	0
Hatfield & Son	395	0	0
Bywaters	390	0	0
Wetherilt, Lee, & Martin	363	0	0

NEW CROSS.—For alterations and additions to New Cross Inn, for Mr. George Pryer. Mr. R. W. Price, architect :—

Adams	£849	0	0
Beale	745	0	0
J. Smith & Sons (accepted)	727	0	0

ST. LEONARD'S-ON-SEA. — For additions to the Warrior-square Concert Hall, St. Leonard's-on-Sea. Mr. Richard A. Hill, architect :—

T. Salter	£588	0	0
A. White	586	0	0
Eldridge & Cruttenden	530	0	0
P. Jenkins	520	0	0
F. J. Cruttenden	449	0	0

SANDWICH.—For alterations and additions to confectioner's shop, for Mr. Lass. Messrs. Bromley & Cowell, architects, Canterbury :—

Wise, Deal	£839	0	0
Denne & Son, Deal	777	0	0
W. W. Martin, Ramsgate	767	0	0

SOUTHMINSTER (Essex).—For the erection of a new Public Hall, at Southminster :—

Bennett Bros.	£734	0	0
T. J. Stammers	704	0	0
Chas. Read	565	0	0
Hy. Bishop (accepted)	560	0	0

STOKE NEWINGTON. — For external repairs and painting at Stoke Newington, for the Incorporated Society of Licensed Victuallers. Mr. W. T. Farthing, surveyor, 46, Strand :—

Spencer & Co.	£670	0	0 !
Pickersgill & Smith	656	10	0
Sykes & Son	448	0	0
W. Canty	435	0	0
S. Hayworth & Son (accepted)	368	0	0 !

UPTON PARK, E.—For the erection of four houses in the Whitfield-road, for Mr. F. Cottore. Mr. Charles E. Jackson, architect, 185, Grove-road, E. :—

G. W. Beale, Cambridge Heath	£1,400	0	0
Coulsell Bros., Bethnal Green	1,400	0	0
C. Everard, Stratford	1,229	0	0
D. Hodges, Upton Park	1,175	0	0
Boulter & Lee, Forest Gate	1,104	0	0
G. E. Baney, Chandos-road, Stratford (accepted)	995	0	0

WIMBLEDON.—For building bay windows to two houses at Pelham-road, Wimbledon, for Mr. Ed. Collins :—

Wm. Groom, Dulwich (accepted)	£158	0	0

[No competition.]

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (or 4s. 9d. per quarter), can ensure receiving "The Builder" by *Friday Morning's post.*

TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

H. H.—W. H. T.—C. S.—F. W. R.—T. C. N. (the main portion of your letter deals with a subject not within our province).—H. S. T.—E. T. (too late).—J. R. T.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

W. H. Lascelles & Co.

121, BUNHILL ROW, LONDON, E.C.

Telephone No. 270.

HIGH-CLASS JOINERY.

LASCELLES' CONCRETE.

Architects' Designs are carried out with the greatest care.

CONSERVATORIES,
GREENHOUSES,
WOODEN BUILDINGS,

Bank, Office, & Shop Fittings.

CHURCH BENCHES & PULPITS.

ESTIMATES GIVEN ON APPLICATION.

Best Bath Stone.

CORSHAM DOWN. | FARLEIGH DOWN.

BOX GROUND. | COMBE DOWN.
WESTWOOD GROUND. | STOKE GROUND.

The BATH STONE FIRMS, Limited.

HEAD OFFICES: BATH.

DOULTING FREESTONE.

THE CHELYNCH STONE. — The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.

THE BRAMBLEDITCH STONE. — Is of the same crystalline nature as the Chelynch Stone, but finer in texture, and more suitable for fine moulded work.

Prices, and every information given, on application to CHARLES TRASK & SONS, Doulting, Shepton Mallet.

London Agent—Mr. E. A. WILLIAMS, 16, Craven-street, Strand, W.C. [ADVT.

HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, on application to the HAM HILL STONE CO., Norton, Stoke-under-Ham, Somerset.

London Agent—Mr. E. A. WILLIAMS, 16, Craven-street, Strand, W.C. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, graneries, tun-rooms, and terraces. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.,
Office:
No. 90, Cannon-street, E.C. [ADVT.

SPRAGUE & CO.,
PHOTOLITHOGRAPHERS,
22, Martin's-lane,
Cannon-street, E.C. [ADVT.

ELECTRIC BELLS and BURGLAR ALARMS (NEW SYSTEM).
Estimates Free on Application to—
MAYFIELD, COBB, & CO., LIMITED
35A and 41, Queen Victoria-street.
THE NEW PATENT BURGLAR ALARM CONTACT is more easily fixed than any other, and CANNOT GET OUT OF ORDER.
Write for Particulars. [ADVT.

MICHELMORE & REAP,
Manufacturers of

COLLINGE'S PATENT HINGES, LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS, and IMPROVED GATE FITTINGS of every Description
36A. BOROUGH ROAD, LONDON, S.E.
PRICES REDUCED. LIST SENT ON APPLICATION.

TWELVE GOLD AND SILVER MEDALS AWARDED.

IRON CISTERNS

F. BRABY & CO.

VERY PROMPT SUPPLY.

LARGE STOCK READY.

Particulars on application.

CYLINDERS FOR HOT-WATER CIRCULATION.

LONDON:
352 to 362, Euston-road.

LIVERPOOL:
6 and 8, Hatton Garden.

GLASGOW:
Petershill-road.